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Oxford and Cambridge Explore

by J. M. HARTOG and W. M. L. WOOD

The Trustees of The Geographical Magazine *Trust Fund have frequently made grants in support of expeditions organized by British Universities. Among recent beneficiaries were the Oxford and Cambridge University expeditions to Spitsbergen of 1949, whose aims and adventures are jointly set forth herein by members of the two parties, Mr Hartog for Oxford and Mr Wood for Cambridge*

In 1949 both Oxford and Cambridge sent expeditions to Spitsbergen. One might think the Arctic round Spitsbergen ought to be as well known as the Alps. It isn't too hard of access, troops were stationed there during the war. There are thriving coal mines. Lighthouses, radio-beacons, a meteorological station, hospital, post office, cinema and all the other amenities of civilization are found at Longyearbyen, the principal Norwegian settlement. Yet only a few miles away there is unmapped, little-known country and countless unvisited islets.

Modern exploration runs on different lines from that of fifty years ago. As the inaccessible places come within reach, so the explorer has to find out more and more about the areas he visits. A thumb-nail sketch together with a few appreciative remarks on the scenery no longer satisfy the geographical societies of the world. Mapping and charting, making a geological survey and collection of rocks, studying flowers and birds, or perhaps just the weather, in a remote place may constitute the object of a scientific expedition. The results of one expedition often lead to another, for as fast as one problem is solved another presents itself. In many cases the field work is closely related to that pursued in the scientific departments of the university at home.

The first university arctic expedition took place soon after the end of World War I when an Oxford party went to Spitsbergen. That was in 1921 and it was so successful that it was followed by further parties in 1923 and 1924, organized each time by Mr (now Sir) George Binney. On each occasion the party included some members from Cambridge, and both universities have gradually developed their own traditions of exploration.

Charles Elton, the biologist, was the leading figure in establishing the Oxford University Exploration Club, which is officially recognized by the University as sponsoring University expeditions.

At Cambridge there is no club of this sort but the Scott Polar Research Institute, conceived by Professor Debenham on Scott's last expedition to the Antarctic, forms the main centre for Polar explorers in this country, and is the local meeting-place for those who wish to take part in these ventures. Another influence there has long been Mr J. M. Wordie, a geologist with wide interests, who was Shackleton's chief of scientific staff in the Antarctic, and whose visits to Spitsbergen in 1919 and 1920 probably inspired the first Oxford expedition of 1921.

The Arctic is not the only place to which university expeditions go: last year, for example, others went to Mount Kenya, the Gulf of Guinea and Borneo. But Spitsbergen itself has special advantages over other places, due to ease of transport by the coal-ships, the summer season coinciding with the Long Vacation, and the distance being sufficiently small to get a party out and back within the limitations imposed by time and funds.

Some expeditions have been lucky enough to be independent financially, but most of them depend on support from the universities, from learned bodies and from industry. For instance, the Cambridge Spitsbergen expedition of 1949 received generous help from the oil companies because of the training value to the young geologists taking part. The locating of oil depends largely on the geological staff which the firms recruit from university students. This Cambridge party was chiefly concerned with systematic mapping of geological formations to the east and north of Billefjorden. In addition to the scientific value of extending and confirming previous surveys in this direction, the expedition's results may be of value if it is ever decided to work the high-grade coal deposits in the

All photographs by members of the expeditions

The only permanent settlements in Spitsbergen are at coal mines. Sveagruva (above) *and the other Norwegian mines are highly mechanized and supply the bulk of Norway's coal at an economic price*

British-owned estates round Brucebyen. Much more research is still necessary, however, before it can be decided if coal can be extracted economically in this area.

The Oxford expedition of 1949 went to North-East Land. A great glacier-cap covers most of the interior of the island, which is the size of Wales. Previous expeditions (three from Sweden and three from Oxford) had explored nearly all of it when an aerial photograph taken by the Norwegians in 1938 showed that an enormous new glacier had formed on the south coast. Owing to the war no-one except a German submarine crew had seen the glacier at close quarters. The expedition's work was chiefly concerned with investigating this change of the ice, but like all the expeditions mentioned it managed to include a good deal of other scientific work in its programme.

Always the emphasis is on science. Binney can boast that sixty scientific papers were published by 1925 (and more followed) as the results of his three expeditions. Discovery is the extension of knowledge in all its forms and the explorer pushes back the frontiers of knowledge in those parts of the world that are least known; these are by no means always the least accessible or the least frequented.

There is a type of person, not infrequently found among undergraduates, who enjoys working out problems and techniques under difficult conditions, when sufficient skill and enthusiasm bring their own reward. An explorer has chiefly to rely on himself and his companions; together they have the thrill of discovering new lands or maybe just a new species of plant or insect. Their whole existence—camping, travelling, looking for what no-one else has seen—provides an excitement and challenge often lacked by those who stop at home. And by contrast it brings a real appreciation of home comforts: how good it is to have a bath and a mattress after living for weeks in a tent!

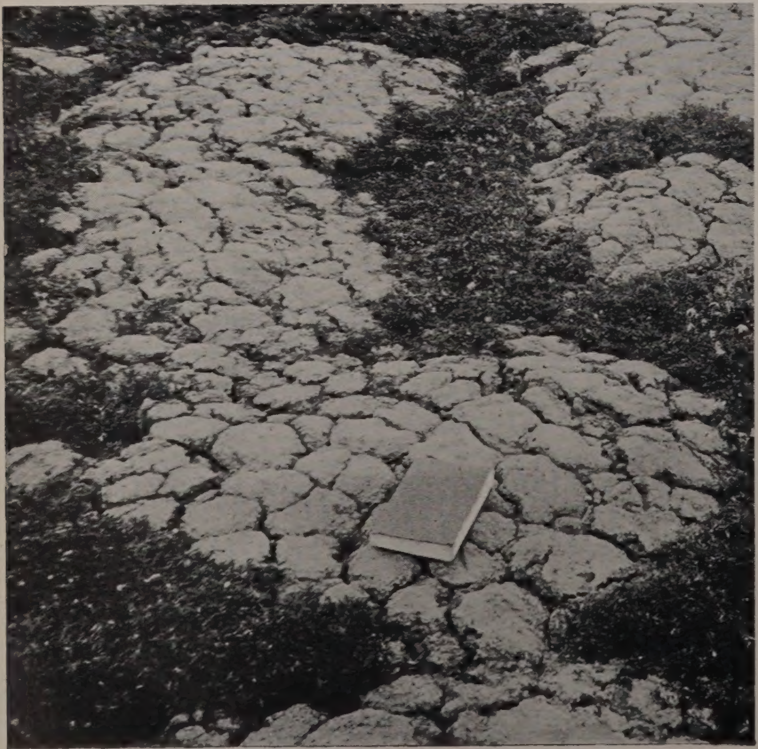
Many of the answers obtained have to be compared with previous results from the same and other parts of the world, so that after one's return there is continuous studying of photographs, specimens and field notes which lead finally to an article in some learned periodical. These papers may well take years to produce in their finished form. The whole time the author is reliving his past life in the far-off scene.

All Spitsbergen is still in the throes of an ice-age. North-East Land is largely submerged under its ice-cap, a solid sheet completely covering the land except for a few areas round the coast. In the centre of the island there is only the smooth flat top of the ice-dome, making a featureless desert. By contrast, owing to the warming effect of the Gulf Stream, West Spitsbergen has advanced from this stage, and the ice-sheets are pierced and fringed by rugged mountains. The sun is above the horizon continuously for about four months in summer, and disappears entirely for three months in the winter. In the south and west the snow melts in summer leaving a coastline of bare cliffs, scree and flat shingle. The monotony is relieved by arctic flowers, mostly dwarfs, with an occasional swamp and tufts of vegetation between the stones.

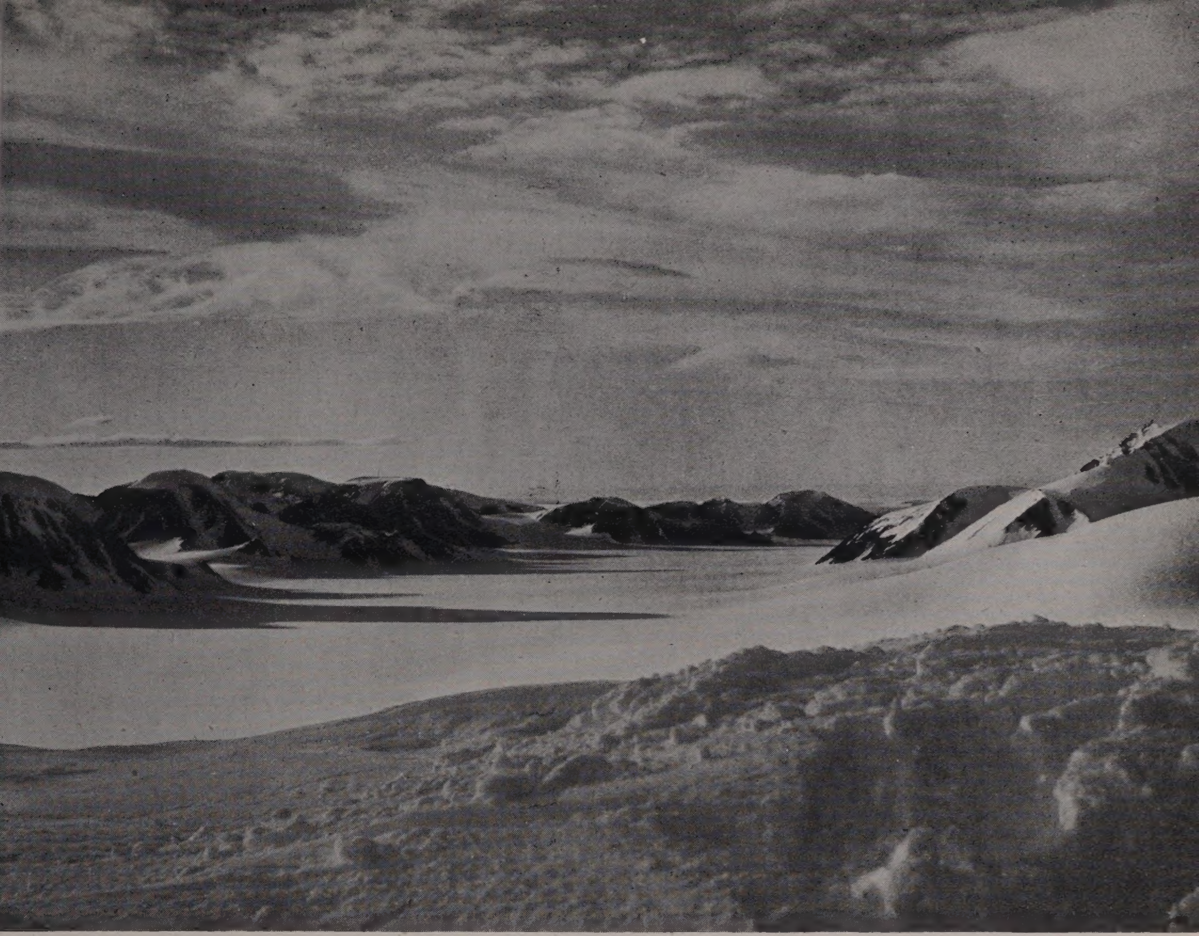
But once one got down on hands and knees one found plenty of vegetable life, if not the variety and abundance of plants to which we are used in warmer climates. Everywhere there are dull-coloured lichens, grey, green, black and reddish. The absence of rich soil is a difficulty overcome by gay little golden buttercups which have their roots in clumps of moss, and provide a welcome contrast to the hundreds of Arctic Poppies looking rather like the white anemones of English woods in springtime.

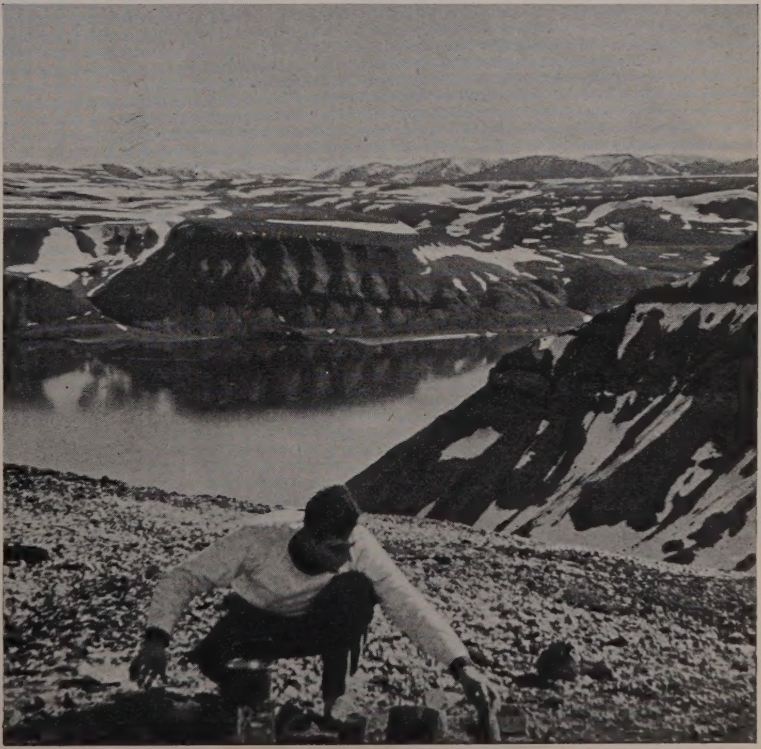
Harland, leader of the Cambridge party, as a sideline from his main geological work, is making a special study of the curious circles known as 'soil polygons'. There are two kinds: those formed by soil and those formed by stones. The photograph on page 364 shows polygons of mud near Brucebyen. Plants grow along the edges of these polygons, in this case mostly the Mountain Avens

In winter sledging is the sole means of transport in Spitsbergen; in summer boats such as this sixteen-foot strandelbarmar *or whaler are used, but high winds and ice make boat-work hazardous*

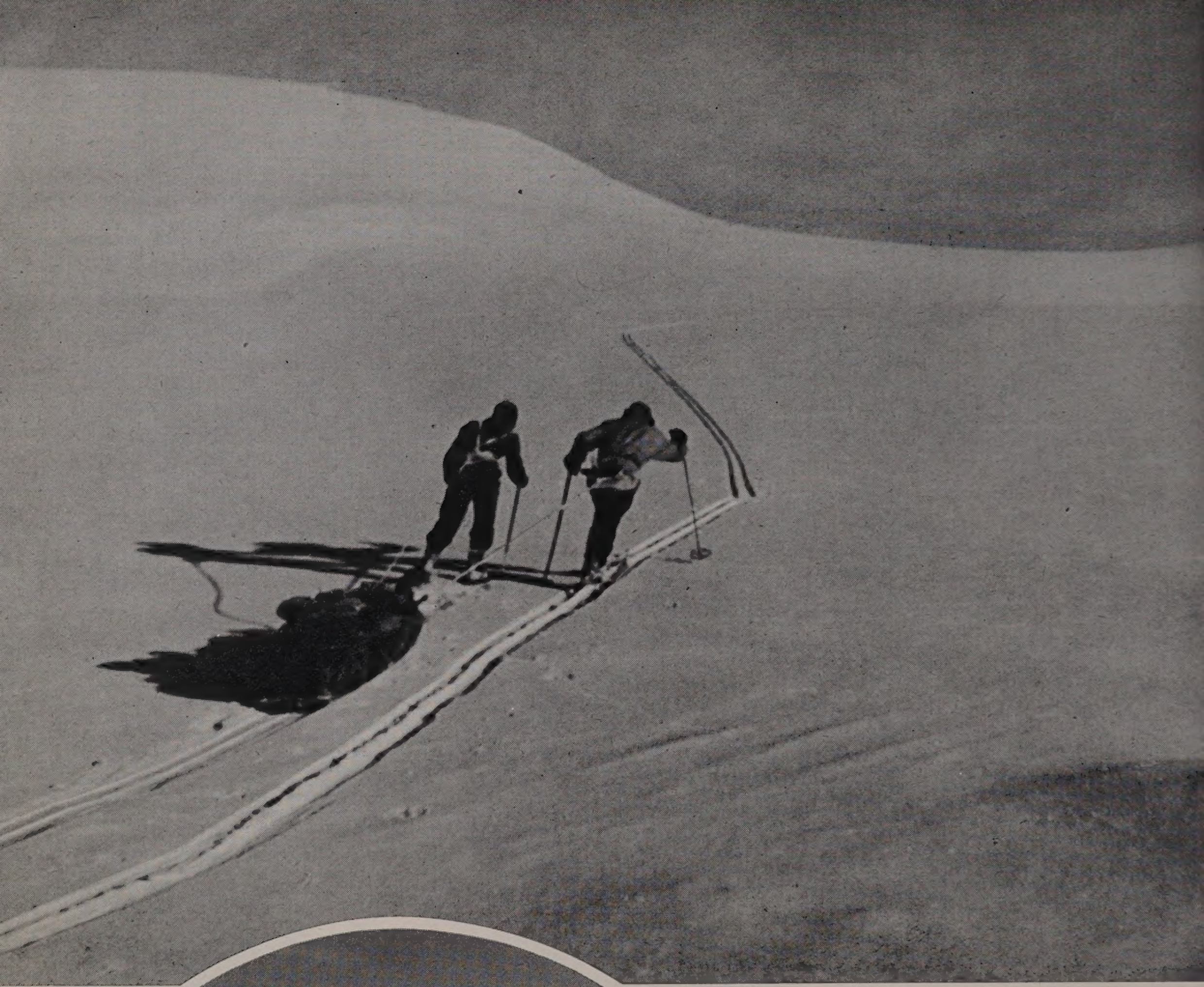


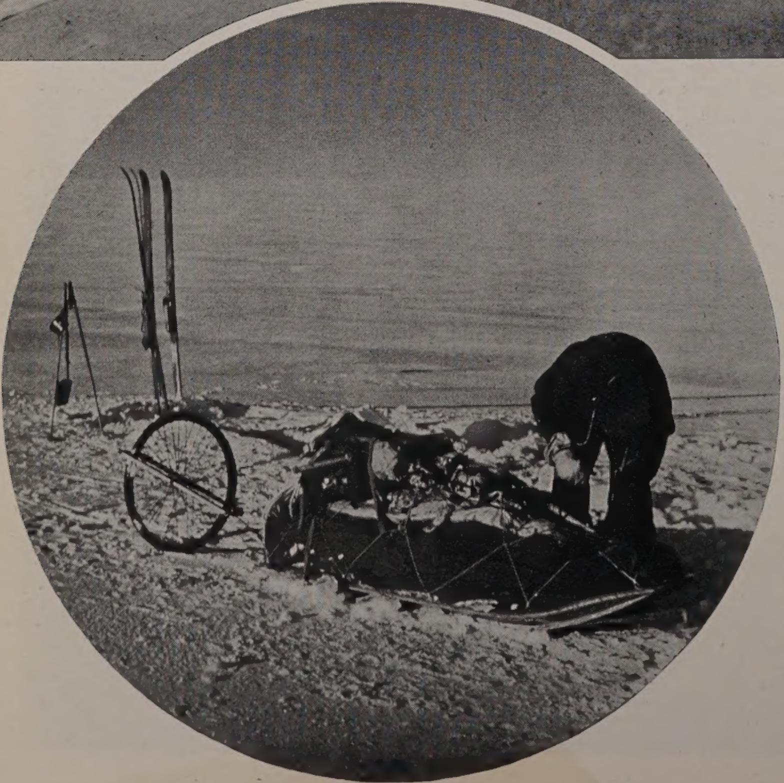
(Above) *Looking eastward from Brucebyen, the main base of the 1949 Cambridge expedition to Spitsbergen and a headquarters of the geologist, J. M. Wordie, thirty years before. The mountains behind are rocky and barren, but plants can be found in the damp ground around the edge of the fresh-water lake.* (Left) '*Soil polygons*' *of mud, near Brucebyen, which were the subject of special study by the leader of the Cambridge expedition. The book, which is six inches long, shows their size*





(Above) *The mountains near the Stubendorff Glacier at the head of Wijdefjorden. During their Northern Survey, a sledge-party from the Advanced Cambridge Base passed through this valley, where the shadows are long, even at midday, as the sun is never high.* (Right) *McWhae of the Cambridge expedition is cooking with melted snow on the top of a mountain by Isfjorden. The hour-glass effects on the mountainsides, the result of erosion by water in limestone, are common in West Spitsbergen*





(Above) *A sledge-party of the Cambridge expedition, returning from the Stubendorff Glacier in West Spitsbergen, follows the track of a skier who has gone on ahead. Much of the uphill work is done with the arms, pushing back on the ski-sticks.* (Left) *This sledge-load includes three men's food for three weeks. Everything is so firmly lashed to the sledge that even if it overturns nothing is lost. A bicycle wheel, towed behind, measures the distance travelled: this information and a compass direction are essentials in finding the way over an ice-cap*

(*Dryas octopetala*), a plant which is also found in the British Isles.

The chief theory put forward to explain the origin of these polygonal markings ascribes them to alternate freezing and thawing, though the exact mechanism has not yet been determined. Harland has been assembling some statistical evidence as a basis for his theories. Where the surface consists of small rocks, as it does on the coast of North-East Land, rosettes are formed with the larger stones round the edges and the finer material in the middle.

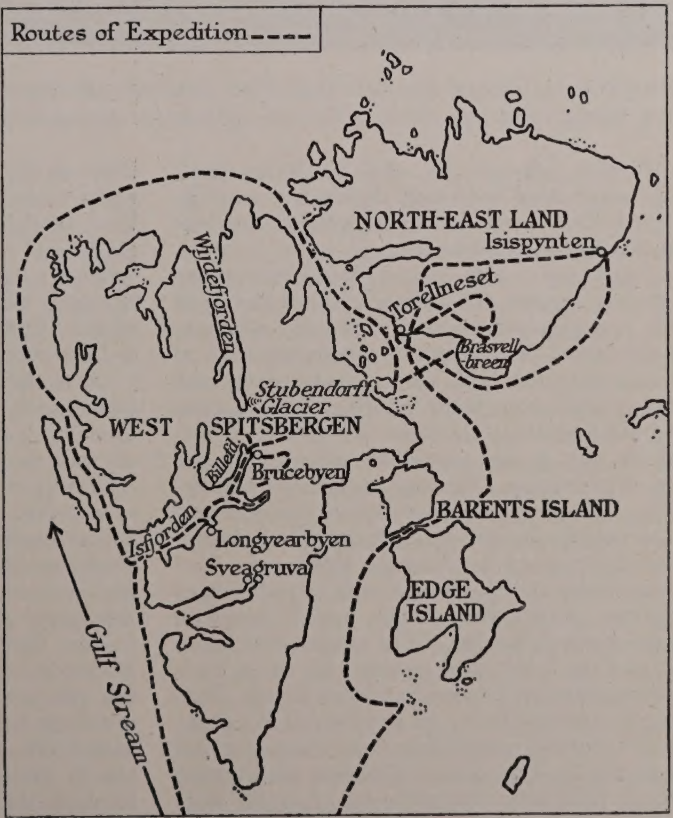
By far the most numerous representatives of the animal kingdom are the sea-birds. At Isispynten we found a colony of Arctic Terns which are about the size of a fat sparrow, with a smart plumage of black and white set off by bright scarlet feet. They much resented our trespassing in their nesting area, and attacked viciously, screaming and diving to peck our heads. Scott-Moncrieff surveying provided them with a defenceless target. But he also became infuriated and finally picked up a foot-length of driftwood to defend himself. Brandishing this in one hand, adjusting the theodolite with the other, he had no chance of reading his angles until he had killed the two most insistent terns. The others still dived round, but were not so bold in inflicting hits. Later we watched the terns applying the same tactics more successfully to marauding skuas.

The two chief ways of getting about are by sledge, wearing skis; or by boat. The coastal waters are quite suitable for small boats in the summer. In winter the sea freezes and so sledging is the only method of transport. Even in the summer high winds and ice in the sea sometimes prevent navigation. Off North-East Land in 1949 there were always ice-floes drifting with wind and tide. A large floe may be anything up to a mile across and when it comes along, one can either pull up on its surface or be pushed along in front, hoping not to be crushed against another floe. In any case it is extremely doubtful that you will travel in the direction you want to go.

At Torellneset the Oxford party had a 27-foot naval whaler, but it was difficult to be sure of getting back to port, once out at sea. At the beginning of September Harley steered the boat through the narrow maze of channels that led to a small island three miles off the coast, never previously visited. Before leaving the mainland he climbed a 700-foot hill behind the camp to spot a way through. This was committed to memory and we worked our way between the ice-floes, twisting and turning. When we reached the island, we found all the beaches were blocked by ice and a landing was made at the base of some cliffs, against which was piled snow overhanging the sea in its lower parts. With an ice-axe Hartog hacked his way up to the steep but easier rocks above.

All the time the party was on the island a look-out had to be kept, and when the wind started blowing from the west we got away quickly through a new passage which had just opened. A few hours later the pack was jammed tight till the wind changed again.

Amundsen in his classic journey to the South Pole showed the superiority of dogs for sledge-hauling; yet in 1949 the Oxford and Cambridge expeditions both manhauled their sledges, and though there were good and



A. J. Thornton

Isispynten on the east coast of North-East Land was discovered by an Oxford expedition in 1924 and named after their river. The ice-cliffs in the background stretch for miles north and south

sufficient reasons for this decision, both parties realized how right Amundsen was. In North-East Land 200 miles were covered in this antiquated manner.

Let us try to give you an idea of what man-hauling means. The alarm-clock woke us in the morning and the cook of the day got up to melt snow. It took about twenty minutes to bring it to the boil, when raisins, demerara sugar and oats were added. A Scotsman would not allow the brew to be called porridge, but it was breakfast, and exactly the same every day. Then we packed our belongings—sleeping-bags, food, tent, theodolite and specimens—on the little sledge of laminated wood designed by Andrew Croft, who had wintered in North-East Land in 1935-6. Three people pulled the sledge, which weighed about 250 lb loaded. The weight was taken round the waist, and to start one threw oneself against the harness just like a horse. Constant pressure had to be applied all the time; one's greatest speed (downhill) was just under two m.p.h. and eight miles was an average day's run; after fifty minutes of uphill slogging, one needed ten minutes to recover. Even so three husky and fit young men found eight hours a day was all they could manage for a week on end; and then, in spite of the perpetual daylight, they had no difficulty whatever in sleeping, having no use for the sleeping-tablets a thoughtful doctor had provided. The latter were only used to counteract the effects of strong base-camp coffee.

Most days were comparatively uneventful. Sometimes, however, sledging has moments as exciting as anyone could wish. In ice there are pits for the unwary: wide crevasses with open tops concealed by a thin covering of soft snow. One survey-party was sledging up the Stubendorff Glacier, six days' journey from their base camp, when the entire party of five men together with one of their sledges descended through an unsuspected snow bridge, deep into a crevasse. One of them fractured his ankle; most fortunately he was the only one hurt. Brasher extracted an ice-axe from the sledge, and the three others followed him along a ledge which brought them out to the surface. They were then able to haul up their casualty and equipment from above, and did not lose a single item of gear.

As there is no darkness in the summer, tents were pitched by the clock. A member of the Oxford expedition is seen retiring for the night, surrounded by skis, pressure cooker and vacuum flask

North-East Land is uninhabited. In West Spitsbergen, apart from a few Norwegian trappers, nearly all the permanent residents are connected with the mining or exporting of coal. There are three Russian mining settlements, all on Isfjorden; and three Norwegian, scattered over a hundred miles. There is little contact between the different Norwegian settlements owing to the difficulties of travelling, and apart from the official visits exchanged by the Norwegian Governor and the Russian Consul there is practically no contact between the two nationalities.

Mining is carried on throughout the year, and the accumulated coal is shipped southwards during the summer. The shipping season, determined by the amount of sea-ice, varies from year to year, and in 1949 was from the end of May to November.

Hr H. Balstad, the Norwegian Governor, who lives at Longyearbyen, administers the civil laws. He gave both expeditions every possible help and encouragement, and without his assistance neither expedition could have been carried out on quite the scale it was. We shall never forget the kindness and cooperation shown us by so many Norwegians: we found practical help and the warmest of hospitality.

As in England, the weather was a never-failing subject for conversation. Some days it was bad, with wind, mist, driving snow or, more rarely, rain. The temperatures had a very important effect on travel. If it was very cold, the sea froze, while the snow covering the land-ice became crisp and hard; a thaw was better for boating, but the slush made sledging difficult or impossible. The Norwegians said that the summer of 1949 was the coldest for forty years, so it was a season for sledging rather than boating.

Yet it had its share of fine days. Then, no matter what one was doing, life was a joy. The blizzards, mist and misery were far away. The clear air, brilliant sunshine and pure snow with the blue sea and skies, dark rocks, distant views, are unforgettable. They are the rewards of the arctic explorer. There is no equivalent in lower latitudes.

A kindly Nature has provided many problems in these parts. They will attract more and more explorers and expeditions.

The Men behind Modern Geography

VI. Ferdinand von Richthofen and Friedrich Ratzel

by G. R. CRONE

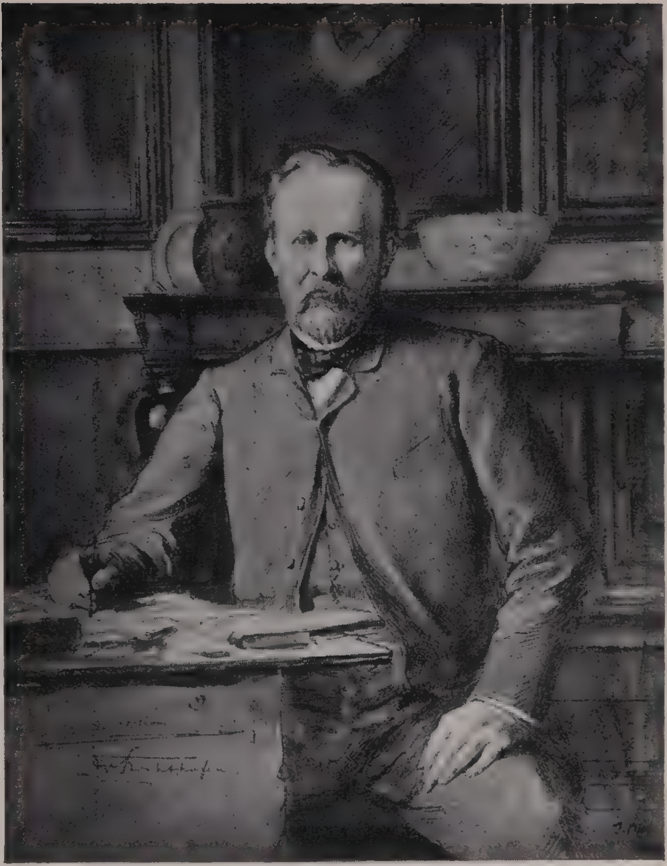
As the development of modern geographical thought is unfolded in these articles by the Librarian of the Royal Geographical Society, it is seen to consist in the search for a synthesis by various approaches. Of the two German geographers whose careers are here described, Richthofen emphasized the physical basis, while Ratzel's theme was the domination of man by his geographical environment

After the death of Ritter the impetus given by him gradually died away, and for a time geographical theory received little attention in Germany. The fact was that his 'school' had wandered into a blind alley. Since no detailed studies of nature were carried out by them their work lost contact with reality, and tended to become subsidiary to history. But in the field, as opposed to the study, the opening up of the continents by European explorers and traders was forcing geography upon the attention of the public, while simultaneously the earth-sciences were making great advances which required specialization, and at the same time provided scientific tools for the more precise study of the earth.

The very success of these associated sciences (e.g. geology, geophysics, meteorology, etc.), and the high degree of specialization they demanded, made it impossible to envisage a general science of the earth, which would bring all these together as a field in which the individual could hope to conduct independent researches.

The great travellers of the mid-19th century, however, performed vital service to geography: they kept alive the art of regional description, as first practised by Humboldt; and several ultimately became geographers as a result of their travels, helping to rescue geography from its dilemma. The whole tendency in fact was to turn to the natural sciences: Ritter's historical approach was useless, for instance, in considering recently opened countries, as in Africa, which possessed no history. But in studying the natural phenomena, geographical distributions were regarded merely as throwing light on the particular subject of a study, and not as leading to the building up of natural regions, as foreshadowed by Humboldt and Ritter. In short this period was characterized by the rapid accumulation of facts, great progress in sciences capable of contributing to the advance of geography, and the lack of a really comprehensive geographical scheme to provide a synthesis. The position very much resembled that of fifty years earlier, before Humboldt and Ritter gave direction to the subject; and again, two contrasting men, Richthofen and Ratzel, appear to set their differing impress upon the content of geography. The first steps had been taken by Oskar Peschel, a keen critic of the Ritter school: with the rapidly expanding knowledge of the continents, it was not difficult for him to challenge Ritter's more dogmatic assertions. Peschel brought geography back to the examination of important earth-features, from a comparative study of which a science of the earth's surface might be developed by induction.

This method of approach was greatly developed by Ferdinand von Richthofen. His career in broad outline was very similar to that of Humboldt. Born at Karlsruhe, Silesia, in 1833, he studied natural sciences, particularly geology, at Breslau and Berlin. In Berlin he attended lectures by Karl Ritter, without, it is said, being particularly impressed by them. From 1856-60 he was a member of the State Geological Institute in Vienna, and worked in the Alpine region. He then joined a Prussian trade mission to Eastern Asia, visiting Java, the Philippines, Siam, and Japan. On its termination he went to California where he carried out researches into the occurrence of gold. The turning-point in his career came in 1869 when he began the journeys in China which brought him fame. For three years he travelled throughout the country, save for the south-west and Kansu, at first studying its structure and geology and carefully mapping his routes, but gradually becoming absorbed in the subtle relations between nature and man. He made a special study of the 'loess' region, both as a geological phenomenon and as an example of the reciprocal action of man and his environment. His great work *China: the results of personal journeys and studies based thereon* appeared, partly posthumously, in five volumes from 1877 to 1912 and set the seal on his reputation—the first two volumes being immediately recognized as a great work of scientific travel. On the appearance of the first volume he received the Founder's Medal of the Royal Geographical Society. Returning to Germany, he occupied chairs of Geography at Bonn and Leipzig, before becoming Professor at Berlin in 1886. For many years he was President of the Berlin Geographical Society and one of his last tasks was to establish the Oceanographical Institute of Berlin on a sound scientific basis. His specialized knowledge was much used by the Prussian Government, and he was a member of the *Kolonialrat.* He had early appreciated the importance of the Shantung peninsula, with its coalfield and favourable trading position, and he was largely responsible for the German acquisition of Kiaochow.



By courtesy of the Royal Geographical Society

Baron Ferdinand von Richthofen (1833-1905), whose teaching strongly influenced modern German geography

It has been said of Richthofen that he went out to China as a geologist and returned a geographer. Whether as geologist or geographer, however, his first interest was the surface of the continents, the influence upon it of the internal structure, and the development and characteristics of land-forms. From this he was led to examine the relation of these features to the activities of man. His great contribution was undoubtedly to physical geography, and more especially to the science of geomorphology, of which he may be considered the founder. He was pre-eminently a master of geographical observation in the field, and by the analysis and comparison of widely distributed land-forms he was able to establish universal types. He was the first to distinguish between 'fjords' (due to glacial action) and 'rias' (drowned river valleys); he developed the conception of plains formed by past marine erosion ('pene-plains'), and founded the geographical study of soil formation and characteristics. His interests ultimately widened to include the whole zone of contact between the land, the atmosphere and the hydrosphere, and the organic and human life appertaining to it. From a close study of the characteristics of regions, he sought to establish a "general comparative geography."

Richthofen's teaching, with its emphasis on the physical basis of geography, has been the dominant influence in modern German geography. Albrecht Penck, who investigated the geomorphology and glaciers of the Alps, was one of his most notable pupils. Outside Germany, his work was appreciated by Vidal de la Blache, but perhaps his most distinguished foreign disciple was the American physiographer, W. M. Davis.

Friedrich Ratzel's progress to geography was less direct than that of Richthofen. He was born in 1844 at Karlsruhe in the Rhineland, and was for some time apprenticed to a chemist, but later succeeded in entering the universities of Heidelberg, Jena, and Berlin, where he studied zoology mainly, but also geology. While working at Montpellier with the distinguished zoologist Charles Martins, he contributed articles to the *Kölnische Zeitung* under the heading "Zoological letters from the shores of the Mediterranean", which attracted attention by their style and content. After serving in the 1870 war, therefore, he was employed as a special correspondent, at first in Eastern Europe and Italy, but later in the United States, Mexico and Cuba. He had been advised to study geography on his travels, and had gradually perfected the art of descriptive writing on the natural scenery. When asked by Brunhes how he came to enter geography, he replied: "I travelled; I sketched; I described, and thus came to the description of nature (*Naturschilderung*). I then returned from America and was told that there was a lack of geographers. I assembled together and put in order all I had myself observed and collected about Chinese emigration to California, Mexico and Cuba, and wrote my work on Chinese emigration, which was my degree thesis."

In 1876 he was appointed to the Chair of Geography at the Technical High School, Munich, and two years later published his first extensive work, a detailed geography of the United States, in which were combined his own travel-observations, the latest results of scientific research, and an economic and social survey. His reputation was established when he was appointed to succeed Richthofen at Leipzig in 1886.

Ratzel is probably now best known for his *Politische Geographie*, which is however simply a development of his *Anthropogeographie*. The first has a sub-title: *Geography of states, commerce and war*; the sub-titles of the two volumes of the second are: *Fundamentals of the application of geography to history*, and *The geographical distribution of man*. His work as a whole is a long-sustained attempt to create a science of human societies, which would form a link between the natural sciences and man. His approach resembled that of a naturalist studying a species, and in fact Ratzel adopted in his studies the concept of the state as an organism. He was aware that the geographer cannot formulate laws expressed with mathematical precision, nor can he conduct laboratory experiments. The only experiments open to him are those conducted by nature, and the answer to problems must therefore be reached by seeking out and studying similar instances in the past.

The state as an organism in Ratzel's view is set down in a definite position on the earth's surface and in a particular environment; it grows slowly, reaches completion, and then declines, and for this it requires a definite space (or area: *Raum*). This is the basis of the idea of *Lebensraum*, which later won so much notoriety. The state in fact is at once a section of humanity and a portion of the earth (or soil: *Boden*), and its destiny is implicit in the character of its area. These earth-influences are constant through history: "The entire history of humanity is development on the earth and with the earth: not merely existing side by side, but living, suffering, progressing, and ageing together." There is no escaping this: "no will can enlarge the area of the planet; no will-power triumphs over the hostile forces in the eternal ice of the Polar regions and the high mountains, or in the deserts. Man will never establish a self-sufficing state at the North Pole, or see a world-city rise in the sandy wastes of the Sahara. Outer bounds are always set to the expansion of a people in space." For these reasons, every people bears the distinguishing mark of its land. The political geographer studies the life of states within these limitations. Progressive states are those which discover and exploit new potentialities in their environment. Man is dependent in his geographical distribution on external conditions, and the freedom of the human will cannot alter this. Success flows from a national policy with a terrestrial basis, i.e. a geographical policy: a universal policy, being unrelated to a particular area, is unrealistic. Some nations have this "geographical sense", often referred to as an urge for expansion, an aptitude for colonization, or innate ruling spirit, and what is called sound political instinct is only "the correct appreciation of the geographical basis of political power".

Ratzel, from his experiences in North America, where he witnessed the great westward expansion of the United States, was impressed with the significance of space in national development, especially when he contemplated the relatively cramped situation in Europe, and his work is dominated by ideas of space and history. These led him to world-embracing views and generalizations which caused him to neglect the other aspect, the effect of man's activities in shaping cultural regions on the earth's surface.

It would hardly be denied now that man's activities are broadly influenced by the major climatic zones, but within them other factors, in addition to the geographical, must be taken into account in explaining the forms these activities take. Since the exact weight to be attached to each of these factors varies from instance to instance, it is impossible to formulate rigid laws, as Ratzel sought to do. Thus his 'determinism' is now generally discredited, though it was not without influence in Germany, as the story of the geopoliticians (to be told in my next article) shows.

Coral Reefs in Colour

by H. S. LADD and J. I. TRACEY, Jr.

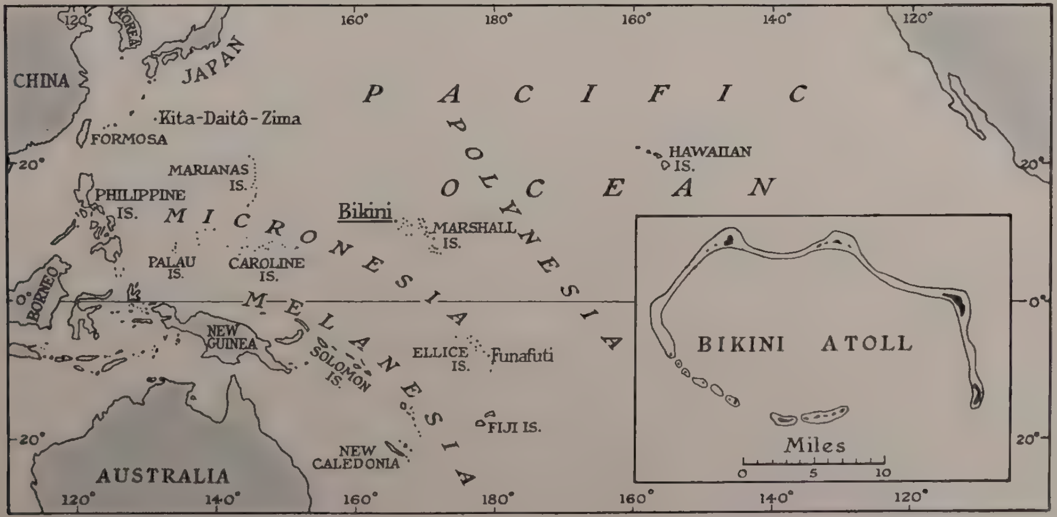
The by-products of the atomic bomb tests carried out at Bikini by the United States Government included research, on a hitherto unprecedented scale, into the nature and formation of the atoll. This was conducted by the U.S. Geological Survey, of which Dr Ladd is Assistant Chief Geologist

Before the outbreak of war in the Pacific the barrier reefs and atolls of the Coral Seas were known to only a few. During the four years that followed, thousands of men became all too intimately acquainted with the reefs and atolls as tricky and efficient defenders of the islands they shielded. The ways of reefs were learned under extremely difficult conditions which allowed neither time nor inclination to observe them as structures of interest and beauty. The war left the Allied Powers in possession of Micronesia with its hundreds of reef-encircled islands. When the atomic bomb tests were planned in 1946, one of these islands, Bikini in the Marshall Group, was selected as a site for the experiments.

For an accurate appraisal of the damage done by the bombs, it was necessary to make a general survey of the atoll: its islands, reefs, lagoon, and outer slopes as well as the plants and animals living on its land and in its waters. Scientists from many fields spent months in the area studying Bikini in great detail and carrying on similar if less intensive studies on neighbouring atolls for control purposes. As geologists we naturally concluded that our assignment—the studies of the reefs, the sediments and the submarine configuration—was easily the most interesting part of the work. Probably the biologists and others reached similar conclusions. In any event, we were not disappointed. The story of the bombing has often been told and will not be repeated here. Our purpose is to picture the reefs that fringe and connect the islands, to describe other reefs that are developed in the lagoon and to tell about the methods used in studying these structures.

Atolls are inscrutable structures. They are mountains buried in water—they rise higher above their immediate surroundings than does Mount Everest—yet they are mere pinpoints on maps of the Pacific. Bikini's maximum diameter at the surface is only twenty miles but the atoll rises abruptly from an ocean that is three miles deep. We now know a great deal about its size, shape and general configuration, about the waters that circulate around it and through its lagoon, and about the plants and animals that form its reefs; we even know a little about its constitution down to a depth of 2500 feet. Beyond that everything is almost sheer guesswork. There are many ideas about what its roots are made of and how they were formed, but the direct evidence for any of these ideas is limited.

Before field-work started at Bikini the United States Navy photographed the atoll from the air; these photographs were invaluable for detailed studies of the broad, flat



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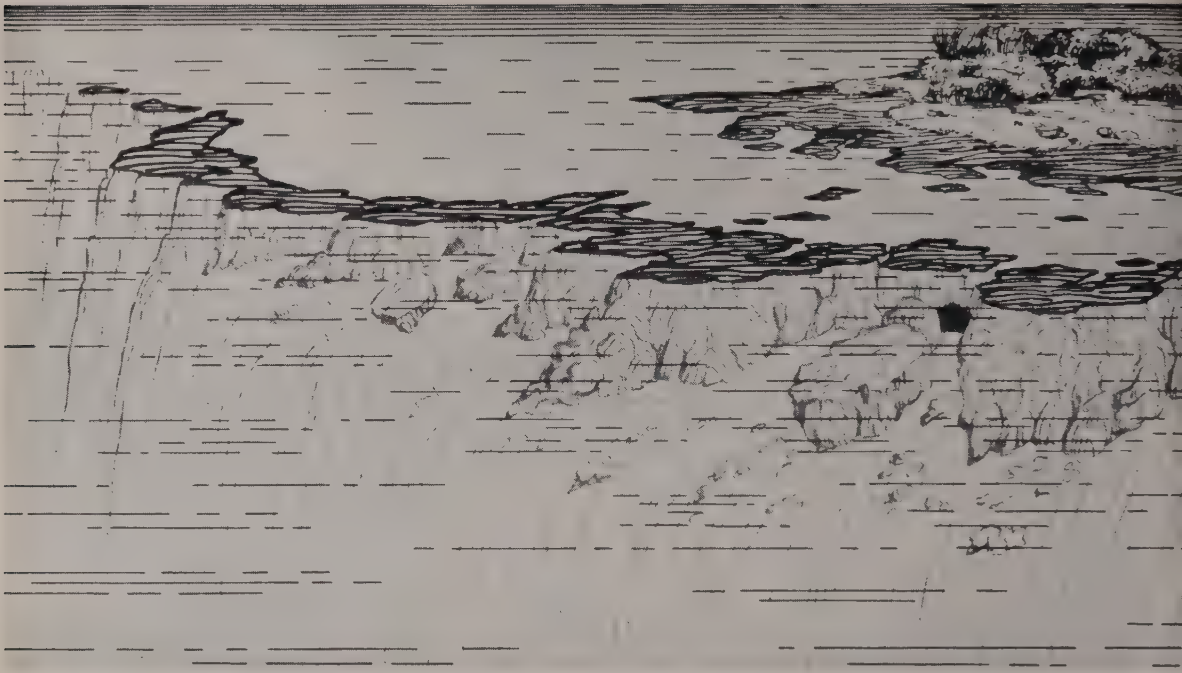


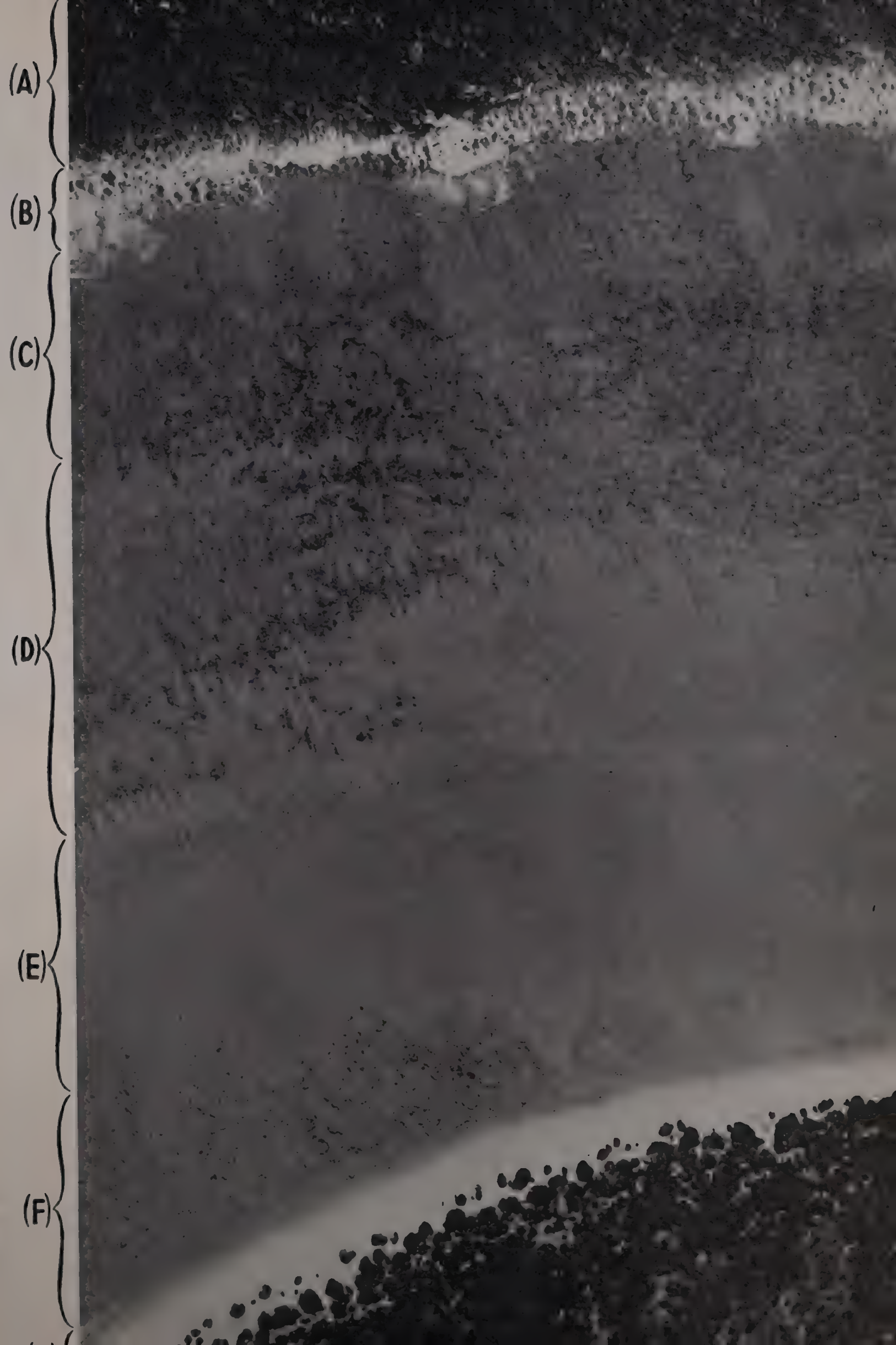
P. B. King and Margaret Austin, from a sketch by Selwyn Taylor

reefs (illustration on p. 375). Likewise during the course of the survey there were many opportunities to study Bikini from the air and thus get a general idea of reef changes around the atoll that would have been difficult if not impossible to obtain even from numerous traverses and examinations on the ground, for the reef does change and many of its features are controlled by the prevailing winds and waves from the east and north-east, and by the rare storms from the south that buffet it. Towards the end of the investigation, when we had become fairly well acquainted with the reefs on the ground, we made a special flight entirely around the atoll to see and photograph the zonation and other changes we had observed on the ground.

The seaward edge of a reef, particularly on the windward side where a protecting ridge is developed, is the scene of a constant battle between the reef-building organisms and the sea (illustration on p. 378, top). It is the sea that brings the necessities of life to the reef-building corals and the algae—their food and nutrient salts—yet it is the waves of this same sea that seek to tear down the structure these organisms are building. Ordinary waves—that is, the waves engendered by the prevailing trade winds from the north-east—are not very successful in eroding the reef even at low tide when the reef edge is exposed and vulnerable. Such waves may dislodge small fragments of coral or algae that have extended their delicate branches too far, but on the

(Above) *A submarine cliff, and an old, eroding reef edge. This drawing of the leeward reef of the Rongelap Atoll, near Bikini, was made after swimming off the reef. The edge of the reef has been broken away by mountainous storm-waves and large blocks are lying on the 'bench' at a depth between thirty-five and sixty feet below water level. Beneath the 'bench' the submarine cliff drops vertically for more than 300 feet*

(Opposite) *The zonation of reefs. This aerial photograph was a most important complement to close-up shots for studying the growth patterns and the different zones that comprise the wide reef flat. Here is a 2000-foot wide section of the coral reef round the fringe of Bikini Island. From top to bottom (in bracketed zones) are seen: (A) the open sea clear of the reef; (B) white, frothy surf coursing over buttresses and surge channels; (C) a zone of small, open pools and cracks formed by the buttresses which have grown together at tide level; (D) a wide, dark and patchy zone of round* Heliopora *or sun coral colonies; (E) a wide, light zone of reef, worn flat, which is exposed at low tide; (F) a second and smaller zone of round* Heliopora; *and (G) the sun-bleached sand and island vegetation*



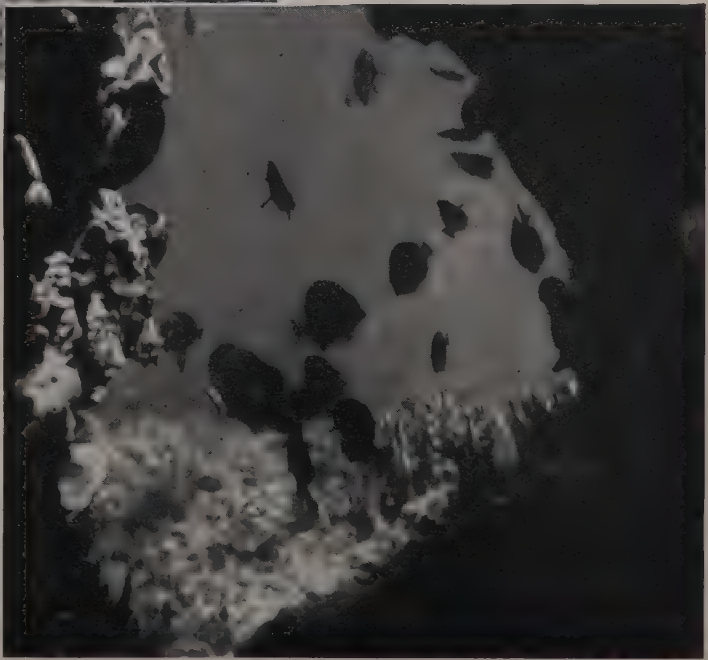
U.S. Navy

whole the reef slowly gains against the sea during periods of ordinary weather. Even storm-waves probably do little real damage to windward reefs, for the protecting ridge is admirably constructed to withstand the attack of the waves. Many of the algae and corals on the marginal ridge are porous or branching so that the force of the moving water is spread over a larger surface than would be the case if the surface of the ridge were smooth like that of a brick wall. This is true on a large scale as well as in detail. The reef edge in many places is irregular, cut by surge channels many of which lead into deep and tortuous caverns below the reef's surface. Each wave that crashes on the exposed reef at low tide has most of its force quickly absorbed by an efficient baffle. The wave rears up like a lion—and turns into a lamb! As each wave approaches the reef edge, the water in front of it is pulled seaward, exposing the buttresses and partially draining the surge channels; the breaking wave falls on the edge with a crash and is absorbed like a spot of ink on blotting-paper. Part of it ripples across the back slope of the ridge, part bores through the surge channel until it meets the backwash of the preceding wave and much of its remaining force is spent in making a patch of choppy water.

On a first visit to the seaward edge at low tide the observer is impressed by the violence

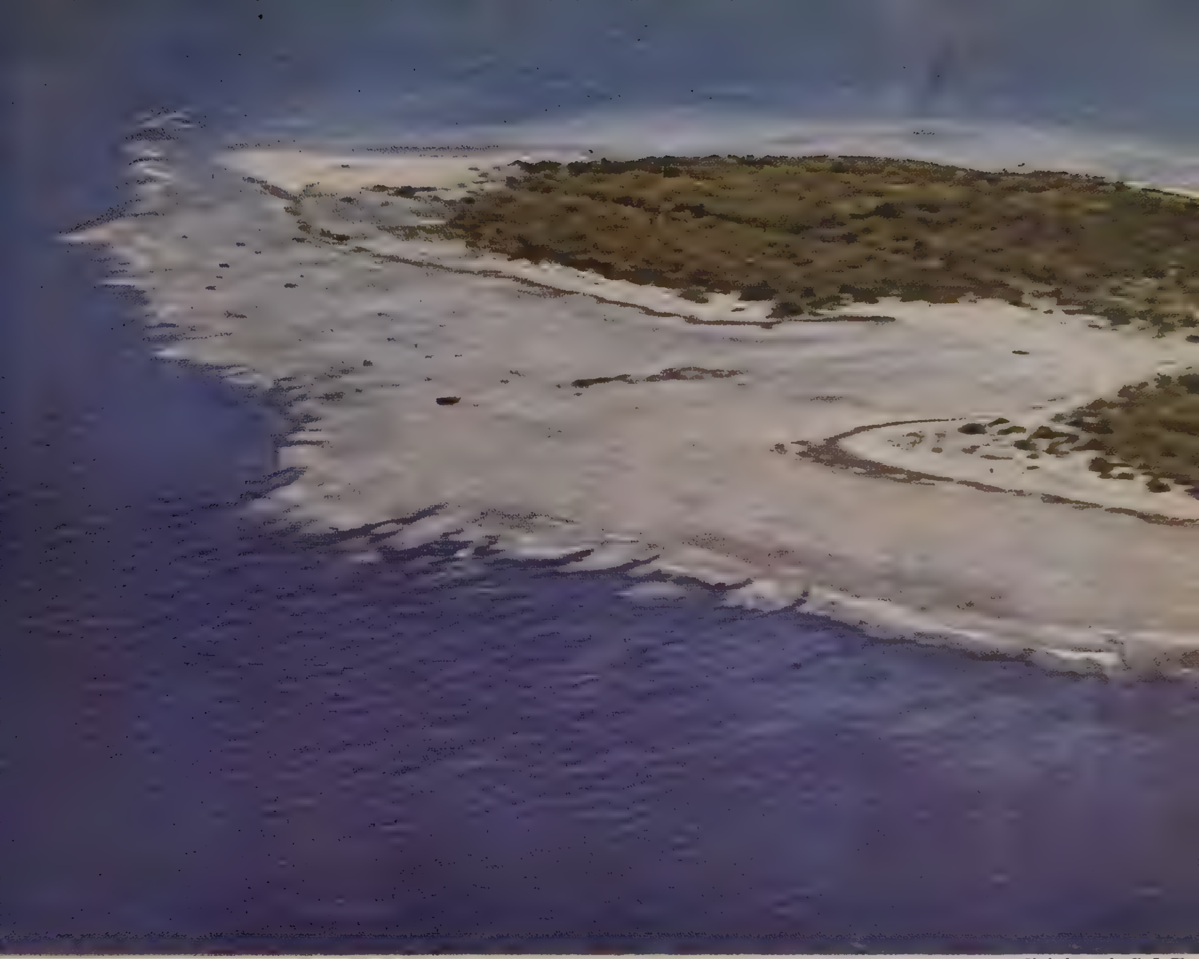
J. W. Wells

(Left) *The glass-bottomed bucket, similar to the type used by spear fishermen in the South Sea Isles, was convenient for examination of the deeper parts of the reefs, or for taking photographs in shallow water. Here one of the party is examining a reef flat at mid-tide*



R. Dana Russell

(Right) *A cavern under the reef, photographed, horizontally, about five feet below the surface; its depth is about twelve feet. The overhanging algal pillars are joined together at the top to form the reef flat. Schools of fish hover lazily in the filtered sunlight, and the shadows formed by the big boulders of the corals may harbour still but menacing forms of sharks*

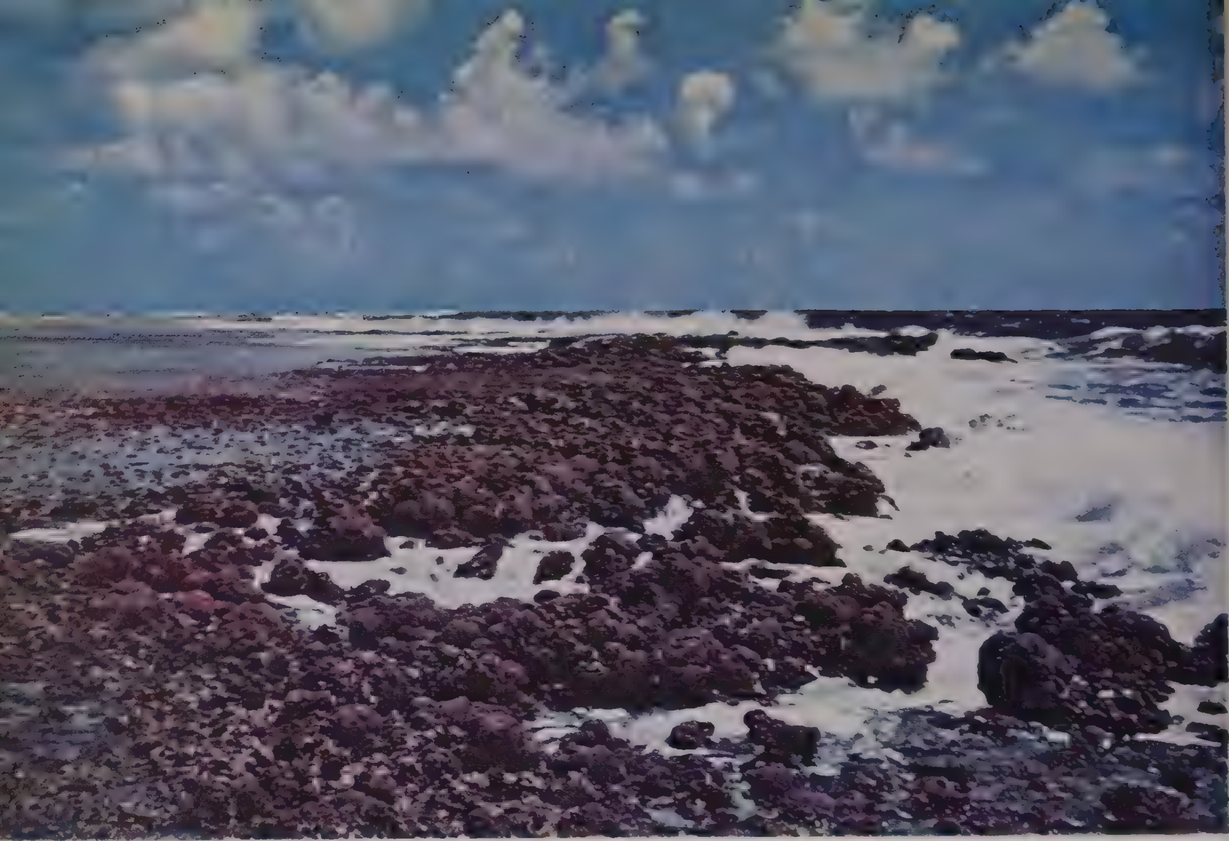


Kodachrome by J. I. Trac

Enirik, one of the islands of Bikini Atoll. The seaward reef is torn by storms, and blocks broken from the edge lie on a shallow submarine terrace. Smaller blocks are tumbled upon the reef flat

of the crashing waves, the hissing white water in the surge channels, the loud spouting of the blowholes, and the gurgles in the caverns beneath one's feet. Later, becoming accustomed to the rhythmic sequence of sight and sound, he learns to brace himself against the waters that survive each initial crash, and begins to appreciate fully the effectiveness of the reef as a breakwater. He learns, too, that it is difficult to maintain footing if the onrushing waters are more than knee-deep; if he is unwary he may lose his footing on occasion and suffer a few scratches, but observers with cameras must avoid such mishaps.

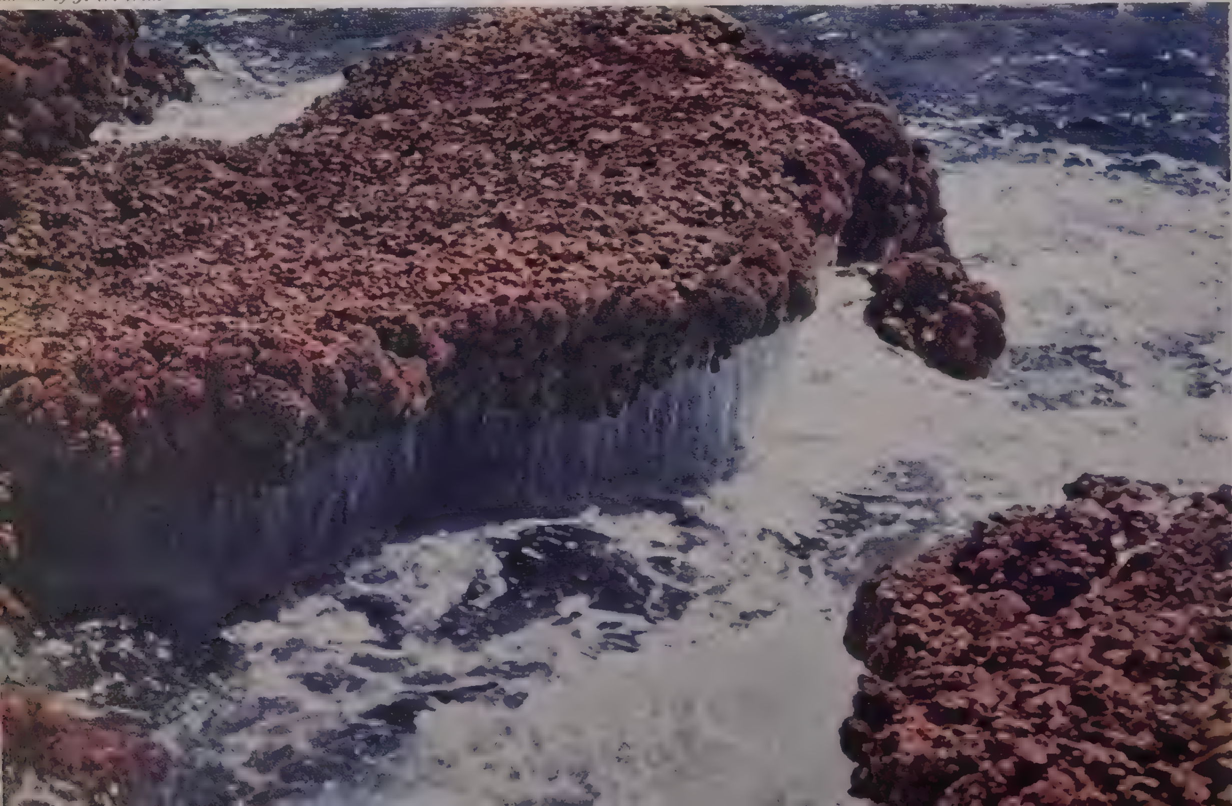
The surge channels that extend landward from the edge of the reef are partially roofed over by out-growing shelves of rock-building algae, simple plants that deposit calcium carbonate, the basic material of limestone (illustration on p. 378, bottom). The roofing-over is irregular, leaving a sinuous line of open pools arranged like fat beads along a string. Swimming in these pools, when one is equipped with a face-mask that permits underwater vision, is a most delightful occupation. The growth of brightly coloured corals on the irregularly overhanging walls of the caverns far surpasses anything to be seen elsewhere on the atoll. Even the smaller pools admit enough light to illuminate the corals that veneer the walls and extend outward in irregular shelf-like projections, and the schools of fish moving in unison (illustration on p. 376, bottom). With each incoming wave the swimmer is gently elevated and propelled forward, with each receding wave the pull is in the opposite direction. In the pools behind the open channel the waves are docile; one has little difficulty in controlling one's movements, and can swim downward and examine closely the bewildering variety of life. The pools are separated by narrow channels or actually bridged by living algae. There is always the temptation to swim under

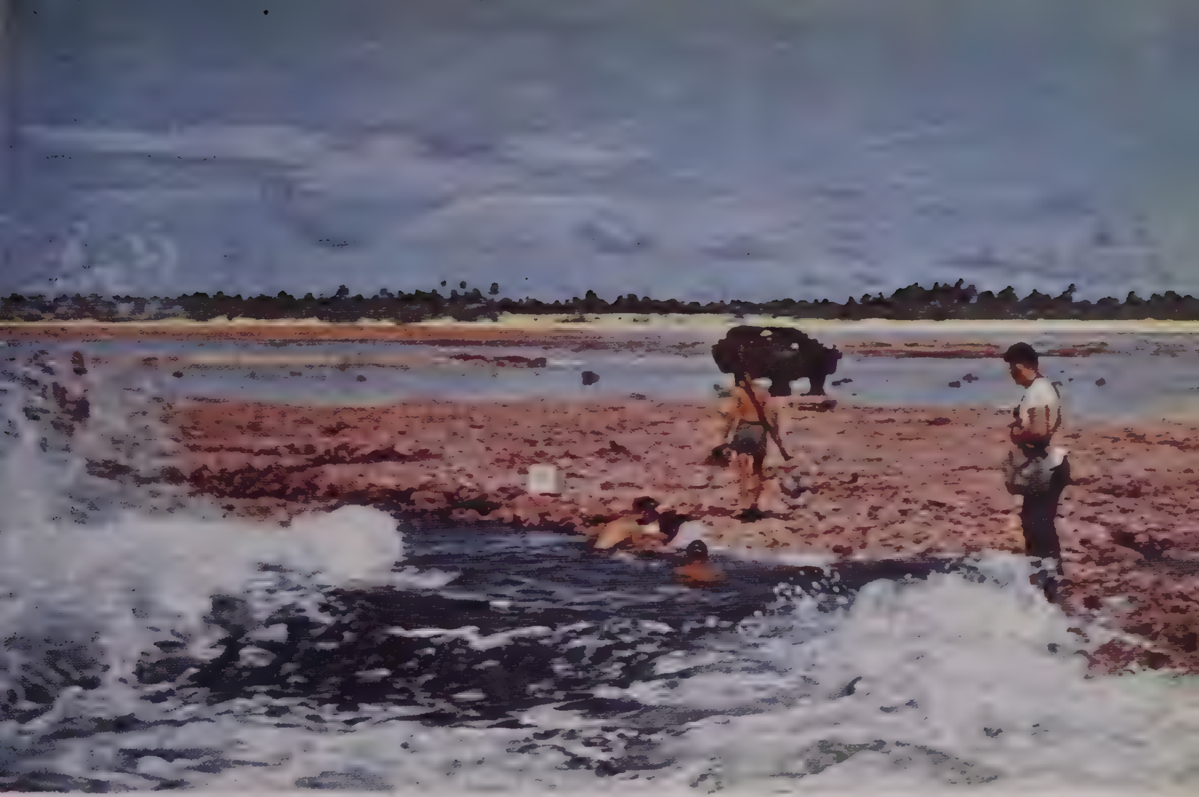


achrome by J. I. Tracey, Jr.

(Above) *A marginal ridge, built of lime-secreting algae, on a windward reef, where surge channels break the force of the waves. On the left is the reef flat.* (Below) *A receding wave lays bare the surge channel on a windward reef. The fast-growing algae overhang the channel, the neck of which is about a yard wide*

achrome by J. W. Wells





Kodachrome by R. Dan

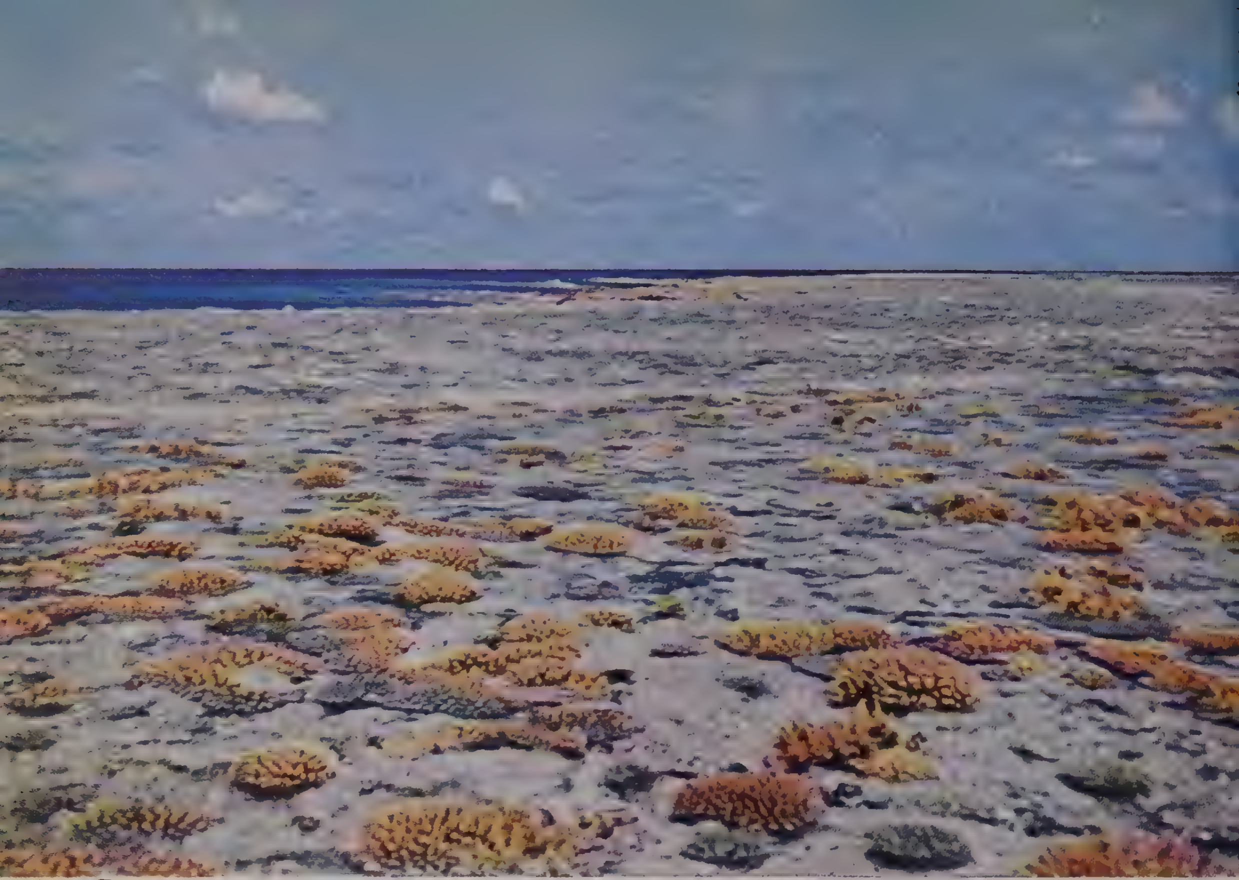
Examining a large pool on one of the reefs near Bikini Island, whose sandy beach and dark green vegetation are visible in the background. In front of the reef a wave has just passed over the margin. Across the flat stands an amphibious DUKW, the unit's chief transport between the islands

water from one of the broad open pools to the next. This is dangerous sport, for it is difficult to judge distances when under water and to estimate the width of the openings ahead.

In the open channel near the edge of the reef the light is strong and it is possible to see the white sand and coral boulders that cover the floor of the canyon-like channel mouth. In this area there are larger fish, including sharks, nosing along the walls or hanging almost motionless in the deeper water.

The lee reef on the west side of the atoll is not impressive at first sight. It is a broad arc that bears no islands, no surge channels, no rugged marginal ridge or other distinguishing feature. There is no pounding surf, and only small parts of the reef are exposed at low tide. It cannot be easily reached from the lagoon side as its concave margin there is irregular, and coral patches of all sizes and at all levels make landings difficult even for small boats. An approach from the seaward side is easier, as deep water extends to the reef edge. Our ship came in close and we rowed to the margin in a wherry. The edge is a few inches higher than the flat main reef beyond it and is well covered with a growth of corals and encrusting algae. Even at low tide the main flat is covered by two or more feet of water. One's first impression of this featureless and relatively inaccessible leeward reef is one of disappointment. We spent some time floundering over the knolls and through the pools of the main flat before we returned to the edge and put on our face-masks to look below the surface. That view made up for the drabness of the reef flat. The coral-encrusted reef edge drops off very abruptly in a vertical cliff that extends through blue water to black depths beyond the limit of vision. Along the edge of this underwater cliff swim schools of fish of all sizes, shapes and colours. Heavy traffic on a busy street! Big fish swimming in calm security, schools of smaller fish darting into 'foxholes' at the first sign of danger. Like the big fish, we floated in calm security. Only after returning to our base did we learn from the fish experts that assassins in the form of barracudas patrol this same busy street.

The south coast of Bikini atoll is a part of the leeward coast and as such is protected from the steady pounding of waves produced by the prevailing trade winds. Its normal



rome by J. I. Tracey, Jr.

These corals are flourishing on a reef flat off Enirik Island, where at low tide much of the reef is laid bare to the sun. The Acropora *colonies in the foreground average about a foot in diameter*

waves are little ones that have no real power to erode the growing reef or retard its development. The reef grows outward and becomes adjusted, so to speak, to the gentle waves that normally wash over it. At long intervals, however, this same coast is subjected to attack from the heaviest storms that, oddly enough, come from the south. These leeward reefs, softened by long periods of easy living, are not prepared for such rare ordeals and may be severely damaged. Storm waves can and do break off large sections of the reef margin (illustration on p. 374). Some segments are flung upon the reef flat as testimonials of the storm's power, but much larger sections, cracked from the reef edge, sink to the flat submarine shelf fringing the southern reef. The blocks that come to rest on the reef flat are riddled by boring organisms and are slowly battered to pieces by waves, but the larger submerged sections preserve their original contours with very little change. The angular re-entrants left by the destruction of the edge may be clearly seen on air photographs though the details of the blocks are hidden (illustration on p. 377). We planned to explore a part of this zone by diving and to this end manoeuvred an amphibious craft equipped with diving apparatus out on the reef edge at low tide. At the last minute, however, the authorities decided that the risk of fouled lines was too great and cancelled the operation. We had to content ourselves with swimming over the collapsed areas and viewing the scene with face-masks. Our considerable irritation over this last-minute cancellation slowly melted away as we paddled and floated face down and gazed at the maze of canyons and grottos.

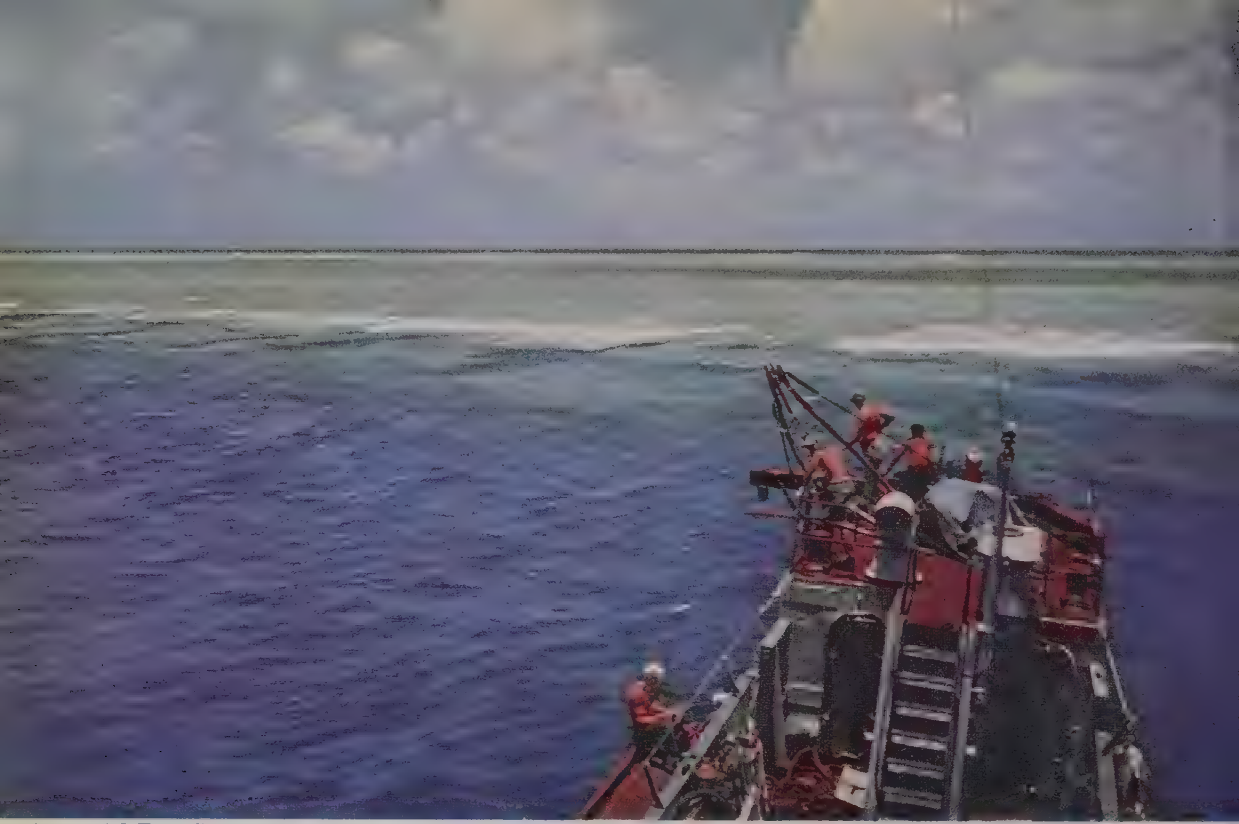
The war which called for so many landings on reef-encircled islands led to the development of several types of special assault vehicles and landing-craft. The most extraordinary of this weird assemblage was the DUKW (illustration on p. 379). The "Duck", as it is commonly known, is a boat with wheels, capable of navigating in water or on land and—what is most important—capable of moving from one to the other under its own power even though heavily loaded. Its speed in water is slow, but it can churn through moderate lagoon surf without difficulty and climb a steeply sloping beach of soft sand. Air pressure in the tyres is regulated from the dashboard—soft tyres to secure good traction in sand, hard tyres for coral or soil-covered ground. When handled by an experienced driver it can slip into the sea off leeward reefs at one point and climb back on at another point. No exposed reef surface is too rough for it—though the jouncing under such conditions greatly exceeds that of the same vehicle in a heavy sea. It can go anywhere on an exposed reef except over cavernous areas near the seaward edge where its weight might cause it to break through. For reef work on an atoll it was ideal, and it was equally valuable for dredging operations in the lagoon. When allowed to drift before the wind its bulk was sufficient to pull the dredge at a moderate rate and insure a good haul of living organisms, sand and weed.

The often-used term "placid lagoon" is a relative one. At most times and places the lagoon is calm when compared to the sea beyond the reef, but a lagoon with a diameter of nearly twenty miles is placid only on those rare days when the air is almost dead calm. The normal trade-winds build up sizeable waves, and a trip across the lagoon in an LCM (Landing Craft Medium) is apt to drench everything that isn't tightly waterproofed—including the travellers who can become just as wet huddled in the troop-well as they can by climbing on the upraised forward ramp and inviting a series of salt-water shower baths. Perched on the ramp one may, between shuddering impacts and the resulting showers, watch schools of flying fish skim gracefully over the waves for surprisingly long flights, only to plop with an ignominious splash at the end. On the lagoon shores of most islands the waves are sufficiently high and the submerged coral-heads sufficiently numerous to make landings with craft of any size difficult, if not impossible.

Lagoons have sometimes been described as bodies of water filling a shallow saucer-like depression. It is true that the deeper parts of lagoons are at approximately the same level, but above the deeper part there may be a well-developed terrace and distinct depres-

A rich embroidery of corals, mostly Acropora *and* Pocillopora, *on a flat pavement coated with tan-coloured coralline algae and the purple* Montipora *which are growing under an inch of water*

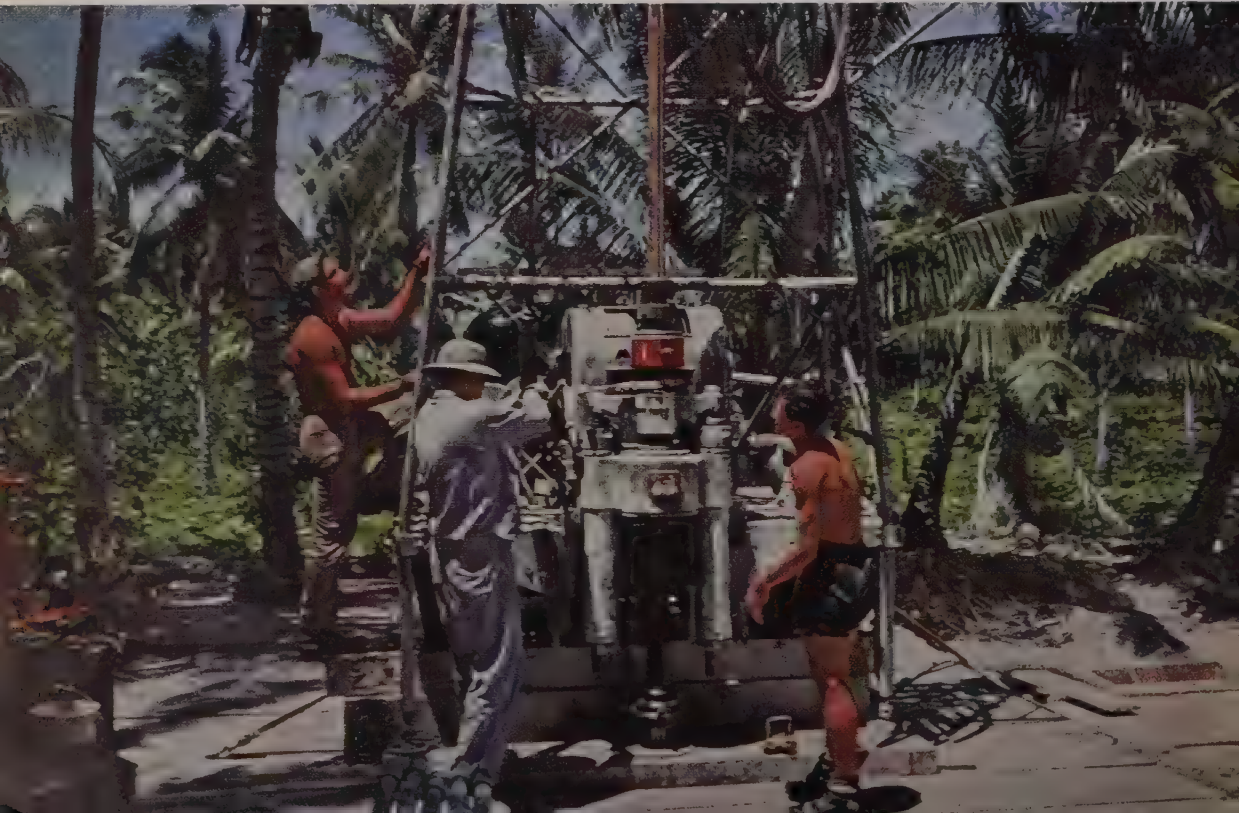
Kodachrome by J. I. T



odachrome by J. I. Tracey, Jr.

(Above) *Dredging on the outer slopes of Bikini Atoll. The small ship makes its haul by drifting up the slope towards the reef, which is detected by the change in the colour of the water.* (Below) *The portable rotary rig, mounted on a truck, set up over the hole which the unit drilled down to a depth of 2556 feet*

dachrome by J. I. Tracey, Jr.



sions. The most extraordinary features, however, are the coral knolls that are developed widely over all parts of the lagoon. 1600 of these structures were charted in a detailed map of the lagoon of Eniwetok, an atoll near Bikini. Their development in Bikini's lagoon is on a comparable scale. Some rise only a little way above the lagoon floor, but others reach within a few fathoms of the surface. We examined several whose flattish crests lay thirty to forty feet below the surface.

The deeper parts of the lagoon and the outer slopes of the atoll were sampled, dredged and cored with a variety of instruments (illustration on p. 382, top). One of the most useful was an improved model of the underway bottom-sampler. This was used by K. O. Emery in mapping the sediments of the lagoon floor. Its operation was coordinated with a continuously recording echo-sounding device and the distribution of bottom materials was thus closely correlated with bottom topography.

Dredging is a fascinating business, but the rewards are even greater if the observer attaches himself to the end of a line and is lowered over the side, equipped with a bucket and a hammer or crowbar. Untrained divers such as we were could do this without difficulty in depths of thirty to forty feet, and we selected coral knolls whose flattish crests rose to these levels from the floor of the lagoon. Preparations are simple: a belt of lead weights and a face-mask to which the air-hose is attached are put on, and there are four signals which are relayed by jerking a rope that is played out along with the air-line: one jerk, stop; two jerks, let out more line; three jerks, pull in line; four, pull me up. One begins to descend the ladder that hangs over the side of the LCM. Air bubbles escape from one's clothing and as soon as one's head is submerged one enters a new and very different world. The bright sunlight and its heat are gone, everything is pleasantly cool and slightly bluish, oddly reminiscent of winter sunlight. This impression is strengthened as one descends to a landscape that at first glance looks as if it were covered with snow. Remembering the diver's advice one stops once or twice on the way down to swallow and thus relieve the pressure on the ears. The air hisses agreeably through the hose and bubbles escape around the edge of the face-mask. The flow of air can be easily regulated by turning a valve at the waist. The top of the knoll has the roughness of a river jammed with ice-floes. Flat, shelf-like colonies of coral project from the sides of small depressions and break off unexpectedly underfoot to send up a fine cloud of white waterborne dust, and branching colonies growing upward like bare bushes also prove to be fragile. The valves of a giant clam three feet in length gape fully eight inches, the open siphon reminding one of the action of a bellows. These large shells are not fastened to or encased in rock as are their smaller relatives on the surface reefs. The big ones close promptly when disturbed and may be rolled over on their sides to make a seat.

In 1947, a year after the bomb tests, we returned to Bikini to resurvey the damage, and in connection with this work we continued the general survey of the atoll. In an attempt to learn something about the foundations of the reef we took with us a core drill and put down a series of holes along the shores of Bikini Island (illustration on p. 382, bottom). Limitations of time and funds precluded drilling to the island's foundation but we did carry one hole to 2556 feet, the limit of our equipment. This was the third deep hole to be drilled on a coral island in the open Pacific. The first was put down by the British some fifty years ago when they cored a hole to a depth of 1114 feet on Funafuti in the Ellice Islands. The second was drilled by the Japanese, who in 1934-36 cored a hole to a depth of 1416 feet on Kita-Daitô-Zima, a small island south of Japan and east of Okinawa. The Coral Reef Committee of the Royal Society reported fully on the Funafuti cores and cuttings, and the Japanese have published several short papers on the drilling at Kita-Daitô. We have now borrowed the half of the Funafuti core that was deposited in the British Museum and have also borrowed the cores obtained by the Japanese at Kita-Daitô. Interesting differences in the three cores are apparent at once and others will doubtless develop as the study is continued. The highest core recovery was obtained on Funafuti where much of the section penetrated was hard rock; the Japanese obtained a fair recovery, the upper part of their section being hard rock. On Bikini we obtained a poor recovery as none of the section was hard rock. There are also great differences in the chemical and organic composition of the cores and in their geologic age. On Funafuti, for example, only Recent sediments were found, but both the Kita-Daitô and the Bikini holes passed through Recent sediments and ended in older Tertiary beds. We would like to return to Bikini with heavier equipment to drill a hole all the way to its hard central core which geophysical surveys suggest is several thousand feet below the deepest level yet reached by the drill.

dachrome by Russell Rosene

Beirut scene: a coffee and a shave in a sunlit café set against its blue backcloth of mountains

The Near East: A Survey

II. The Lebanon and Syria

by LOVETT F. EDWARDS

Mr Edwards was until recently the Daily Telegraph *correspondent in the Near East. This is the second of three articles in which he shows the disparity in men, minds and methods between the countries composing that important area, and thus how dangerous it is to generalize about them*

SOUTHWARD now: to Beirut. It will be a pleasant journey, for the Lebanon has become the Land of Cockaigne. The formal bureaucracy of Turkey is tempered by a genial corruption. With one of the most unstable governments in the world, the Lebanon has probably more millionaires to the square mile than any other area save New York. Her life is affected by this. Comparatively undistinguished in appearance, Beirut has some of the most beautiful surroundings of any city and has certainly the richest night-life of the Mediterranean. Its typical inhabitant is the well-to-do merchant whose cultural tradition, and usually language, is French. If not in his intellectual capacities, this is amply reflected in his women and their allure. Far from regretted at her departure, France is now credited with the charm of her culture and way of life while the tactlessness of her administrators has been forgotten. Journalists, UNO observers and other birds of passage would rather live in Beirut than anywhere else in the Near East.

Its hospitality is boundless. While still a visitor of only a few hours' experience, I was whisked up into the mountain villages of Aley and Hamdoun by a local merchant whose acquaintance I had made over a bar with a casual question. In these villages, 3000 feet up in the Lebanon, the lavish life of Beirut is continued during the summer months when the heat makes the city sticky and uncomfortable. The night-clubs move up here in the clear cool mountain air, almost always cut off from the city below by a thick cloud of condensing heat, so that one gets the impression of being in another world. Here the merchants have their summer villas and the hotels are equipped, down to the knives and forks, from the United States, regardless of dollar shortages that garotte the rest of the world.

Nothing is taken too seriously, save perhaps trade. During a visit to Beirut at the time of the Arab-Jewish war, I was chatting with a Lebanese officer in the bar of the Normandie Hotel. I had a camera slung over my shoulder.

Suddenly I recollected that the country was supposed to be at war. "I suppose", I said, "that I shouldn't be taking photos."

"Did you take any military installations?"

"Not as far as I know. In fact, I don't think I even saw any, unless you count that . . ." I answered, pointing to the harbour where lay the magnificent yacht of the former German Chancellor, Herr Hitler, now belonging to the family of the Lebanese President.

"Well, don't worry about it then."

I couldn't help commenting on the lack of interest in the war and contrasting it with the war fever in the countries around.

"You see, we didn't want this war. We have nothing against the Jews or they against us. In fact many of us, especially the Christians (and I am myself a Christian, by the way), are more afraid of the Moslems. There are more of them, and they are nearer.

"The Jews don't want anything from us. We have got far too big a population already. There is no room here for Zionist colonization. As it is, we can only keep our standards by intensive emigration. We should much prefer to trade with Israel, who needs our vegetables and livestock and would pay well for them. But we dare not trade openly with them while we are members of the Arab League. I don't need to tell you that there is a good deal of trade now going on through

Except for the Arab clothes, the fezzes and the shoeshine boys, Beirut's Place des Martyres might be in a French provincial town, and clearly shows the cultural influence of France on the Lebanon

Pictorial Pre

the Galilee villages. Neither side minds much and the smugglers are making a fortune.

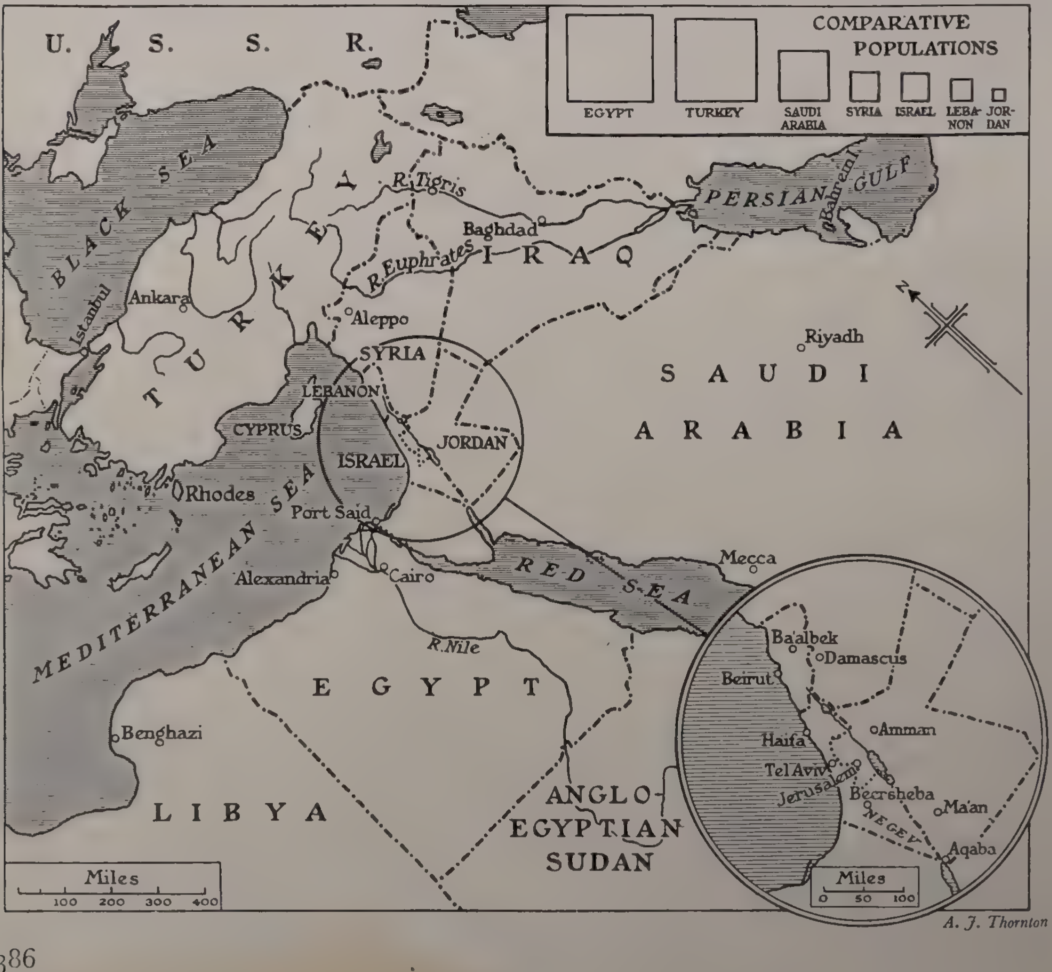
"You know what the Jews say about us? They say we have only about 3000 men in the field, and that 1500 of these are busy preventing the other 1500 from going home to their villages. Of course it isn't true, nor is it even very kind. But it is not so far wrong if it alludes to the attitude of our peasants. They don't see why they should kill Jews who haven't done them any harm, and many of whom used to live with us as good neighbours."

I was not so much surprised at the anecdote, as at hearing it from an officer in a Beirut hotel.

"The Jews have built a national home down there in Palestine. Why shouldn't we Christians try and build one here in the Lebanon for ourselves? As far as the Near East is concerned, we need it quite as much."

Lebanon has, of course, her social troubles. But they are the troubles of a changing world rather than due to her own peculiar position. Perhaps typically, there lies between the Lebanon and the Anti-Lebanon ranges the largest classical temple still more or less complete, close to the yet greater ruins of the temple of Jupiter at Baalbek—it is the Temple of Bacchus.

Eat, drink and be merry! But there is a corollary, "for tomorrow we die". Lebanon in general and Beirut in particular is very conscious of being a foreign island on the outskirts of alien peoples, even as she was during Crusader times and still earlier when she welcomed with her lavish hospitality the exiled Egyptian nobleman Sinuhe nearly 4000 years ago. The taxi-driver, the waiter or the newspaper-seller will hasten to tell you that he is not an Arab. There, probably, he is right. He claims to be a Phoenician. There, probably, he is wrong, having learnt it from a separatist school-book. In fact he is an incredible mixture, best defined as Levantine, a people living half in the Eastern and half in the Western world with no sure foothold in either. He retains the mocking, sensuous tradition of this area in classical times, when the people of once mighty Antioch braved the



A. J. Thornton

Associated Press

(Above) *The miserably poor inhabitants of the mud huts in Syrian villages such as this have suffered from centuries of maladministration. The influence of absentee landowners is gradually being replaced by that of military cliques.* (Below) *A corner of Damascus market, where the inhabitants bargain for shoddy goods*

Paul Popper

Arab "coffee-house politicians". Very much in evidence in Syria, they discuss, over endless hubble-bubble pipes and cups of coffee, coups d'état *and the merits of rival political creeds, and form the rank and file of revolution for the various military cliques*

ctorial Press

displeasure of the Roman Emperor in order to make fun of Julian's beard.

Go over the mountains into Syria. It is only a couple of hours by taxi. At the frontier post, just beyond the Anti-Lebanon, there is at once a change. The neat villages give place to ramshackle huts hemmed in by prickly pear or, further north, by groups of clay wigwams with floors of beaten earth and no opening for light or air save a low doorway through which one must bend double to enter.

Many other differences, too, can be felt rather than seen. Already there is the flavour of the desert. But the men who examine your passports with extraordinary minuteness have the sullen cunning of town-bred Arabs and lack the primitive openheartedness of the Bedouin.

The land seems desolate. Centuries of fatalism and maladministration have reduced it to a sandy scrubby borderland called "fertile" only in contrast to the vast sterility of the desert itself. Much could be reclaimed. But by whom? This land is underpopulated (at least in regard to its potentialities) and firmly in the grip of a land system which desires only immediate profits. The influence of the landowners, once all-powerful and often absentee, is slowly being replaced by that of successive and ephemeral groups of military adventurers. The change can hardly be for the worse; but can one say it is for the better?

These cliques rise and fall with South American frequency. Their leaders, despairing of the inadequacies of democracy as they know it, continue to pay it lip-service while in fact upholding the rule of the jack-boot. With a frightened eye on Communism, they regret the passing of Nazi Germany whose propaganda was strong in this area during the war and with whose methods they have a sneaking sympathy. The French administration, sentimentally regretted in the Lebanon, is regarded in Syria as merely one of a series of oppressions. The town-bred Arab is restless and discontented. Usually an underpaid employee who ventilates his economic grievances in political form, he becomes that typical figure of the Arab world, very evident in Damascus, its cultural capital: the coffee-house politician.

"France treated us like colonials and answered all our grievances with guns. Great Britain treats us like children and refuses to believe we have grown up. They want us to become Levantines, men forced to live between two worlds and to forgo our Arab heritage.

"It was an Arab army that liberated Damascus from the Turks and all we got for it was another yoke. Now, we Syrians were the one Arab country who defeated the Jews. But

Major Said Houbby, a Syrian infantry commander, gives orders to some of his men during manoeuvres near the Israeli-Syrian border. The recent series of internal 'putsches' were organized by the army, which takes a large part in political affairs

Associated Press

this is only the first round. . ."

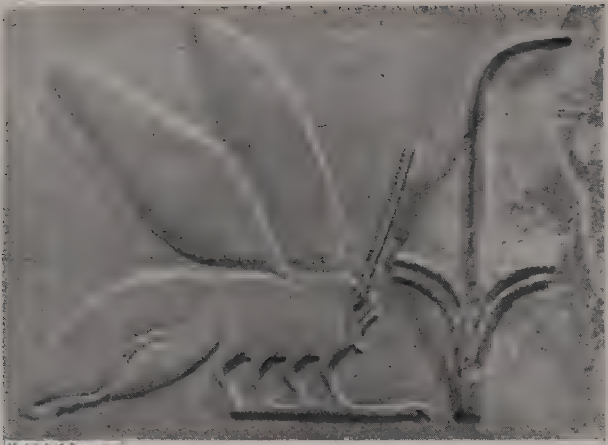
The Syrians are likely to remain one of the most uncertain factors in the Near East. Though Zionist claims do not encroach on Syria, her leaders are well aware that they possess huge dormant areas which Jewish agricultural enterprise, and for the moment that alone in the Near East, could make profitable and habitable. The Arab refugees from Palestine encouraged this fear. Although they received practically no help materially from the Syrians, who looked on them with suspicion as possible competitors, their presence fanned the fires of resentment.

Disgruntled officers and coffee-house politicians dream of various political combinations in which, naturally, they and their colleagues must play a leading part. Although in comparison with the fanatic self-centredness of the Jewish terrorist groups these are mere vapourings, they cannot be entirely disregarded. For they show a spiritual ferment, based on a nationalism which, though its practical results are ridiculous (for such progress as has been made was made, despite my enthusiastic informant, by other forces), is, at bottom, sincere.

Furthermore the brawlers and dreamers are the rank and file on whom the various military cliques must depend. One or other of them form the political background for the various *coups d'état*, even as the secret societies among the Arab officers under the Ottoman Empire weakened the administration and led eventually to the triumphs, such as they were, of Arab nationalism at the close of World War I.

Eventually the solution will be found, at least temporarily, in some form of authoritative government. For democracy they are unripe; there is much talk but little else. They are growing out of tribal rule. Communism is a possibility, though at present remote. Still, Moscow is active, fanning the fires of disunion and fear of the West and of Israel, though sometimes inaptly combining the two. Only about two years ago, Mr Gromyko could speak of a Jewish state—then still to be born—as the instrument to "liberate the peoples of the Arab East from the last shackles of colonial dependence". But the Syrians will eventually find some form of political discipline. Despite the ill-fated Husni Zaim, it would seem that this discipline will be military.

This will give the coffee-house politician the authority he seeks and the discipline he needs (if the system of evading the last and less agreeable of these factors is suppressed). The peasant may find security in having only one oppressor whom he understands, and the chance of being constructive without having to think out for himself the why and the wherefore.



British Museum

Bee sucking honey: detail from an Egyptian limestone carving, probably of the XIIth Dynasty (c. 2000 B.C.)

Animals and Man

II. Domestication: providers of food and clothing

by G. S. CANSDALE

In June 1950 we published the first of a series of articles by Mr Cansdale, Superintendent of the London Zoo, regarding the way human action influences the geographical distribution of animals. The present article and its successor show where and when animals entered the service of mankind

Most people would find it much easier to name a domesticated animal than to say precisely what constitutes one. One short definition is: "a form living in symbiosis with man", symbiosis being a state in which each organism is dependent on the other. Another and more detailed definition reads: "Those animals which form part of a household, which are under the domination of a master to whom they give their produce and services, which reproduce themselves in their state of voluntary captivity and produce young which, like themselves, are attached to the household and become servants of the master". In general, domesticated animals differ very considerably from their wild ancestors, though there are numerous exceptions; in many cases, too, they derive from animals which are gregarious in the wild, a fact which may well have assisted in bringing them in the first case into this intimate contact with mankind. There is a distinct difference between tameness and domestication; single animals of a very wide range may be tamed, but whole species are not thereby domesticated.

Only man among the higher animals employs other creatures in this way, and to find anything approaching it we must turn to the ants and termites; it might perhaps be claimed that cuckoos and other birds make use of foster-parents, but this is mere parasitism. The relationship between ants and aphids can easily be observed in Great Britain, but in many tropical varieties the ants go much further, confining their 'cows' in underground pens with entrances passable only to the ants, and letting them feed on the sap in small rootlets. In many nests a variety of 'guests' can be found, belonging to many insect orders, and this seems to be true symbiosis, for these guests, rarely found outside ant or termite colonies, are fed by their hosts or feed on the host's eggs and young in return for services rendered in the form of tasty morsels which they secrete.

Animals brought fully into the service of man can be put roughly into three categories: (1) providers of food and clothing; (2) transport animals; (3) pets, companions and allies. Many fall into two of these classes and the minority into only one.

Domestication began in the early ages of man, and nothing is recorded of the manner in which it took place. One thing is certain: that few types of domesticated animals had a single origin; it would seem that there was a widespread human movement, with types being brought into domestication at several different places, sometimes more or less simultaneously, sometimes at wide intervals. There is general agreement that the dog was the first real associate of mankind; among the providers of food the order was ox, goat, sheep and swine, while in the draught animals of the Old World it was apparently camel, ass, horse. As in so many spheres, opportunity is the great thing, and this explains the comparative poverty of the New World as the origin of household stock; it explains also the almost complete lack of domesticated animals among the forest tribes of Africa, for there is virtually nothing suitable among the local fauna. For the same reason Australia has made but one contribution, the Budgerigar, which is included among the companions of mankind.

It is outside the scope of this article to discuss the full implications of animal domestication in the development of the human race, since that is a subject for the anthropologist, but in the realm of transport the advent of draught animals was about as revolutionary then as the coming of the railroad and motor-car has been in a much later era. The development of a pastoral life made it possible to occupy new areas in the Middle East several millennia ago, just as ranching and sheep-farming have been of great importance in opening up the New World and Australasia.

Europe can claim to be the origin of the world's most important animal—the domestic cow, descended principally from the Aurochs; this great beast, standing some six feet in height, survived in Poland until the 17th or 18th century, but in Great Britain it had died out undomesticated in prehistoric times. Neolithic man brought with him to England a small dark red beast called the Celtic Ox, but both man and beast were later driven west and north by the invaders from the Continent and brought with them the tamed Aurochs. Although the cow has many different uses there are three principal ones: the production of milk, meat and manure. This last is very important but it is largely independent of the type of cattle which have therefore been developed to produce meat and/or milk in a variety of climates. In Great Britain, for instance, there are some twenty main pedigree types, the result of centuries of selection and segregation. Cattle have always been a mainstay of human life, and in parts of Africa today there are still tribes which live on little other than milk and blood drawn from their cattle; at the same time their animals are very important as visible wealth. The African cattle, however, largely spring from another stock—Zebu—which probably came from the wild Banteng of South-East Asia. This is also the home of the Water Buffalo which must be rated the most important domestic animal in the tropics; it is estimated that there are 20,000,000 in India alone. The Water Buffalo is of ancient origin and is shown in drawings four to five thousand years old. Invaluable for cultivating the rice-fields, it is also used for ploughing throughout Asia and even in the Danube Basin; in addition it provides excellent milk and meat.

Far to the north, along the Himalayas, the Yak was tamed by the Tibetans many centuries ago, and today, little different from the wild form except in coat, it still serves its masters well, giving milk and meat besides carrying them and their goods over the high passes.

The only near approach to man's domestication of other creatures is to be found among the ants and termites. Here a colony are seen herding and milking green-flies, the ants' equivalent of cattle

Picture Post Library

British Museum

Boy on Water Buffalo: from a painting ascribed to the 12th-century Chinese painter, Liu Sung-Nien

The sheep form another important group, and they also have three main uses: the production of meat, wool and manure. The wild ancestors of the sheep are not definitely known, but they are likely to include the Mouflon of southern Europe, still found in Corsica, and some of the wild sheep of western Asia. The Soay sheep, seen today in most Zoos, indicates the type of stock from which the present flocks in Great Britain are descended. Over thirty varieties of sheep are in use in Great Britain today, selected to yield meat or certain types of wool in localities varying from mountains to marsh. The original sheep was horned, but through centuries of selection many breeds are now hornless. Like the ox the sheep is primarily a grazer, in contrast to the coarser-feeding goat which prefers to browse. The domestic goat derives in the main from the wild goat of western Asia. In Western Europe it is not often of major importance and it is only used locally for milking, but in Mediterranean lands, in the Middle East and in parts of Africa it occupies a much bigger place in the local economy, and is valued for its hides, milk and meat, though the meat from an adult male is inedible. Although there are no true wild goats in Great Britain, a number of domestic animals have escaped into the hills to found semi-wild herds. During World War II the goats on some of the Irish hills were shot to feed the lions in the Dublin Zoo.

In recent years the pig has greatly increased in importance as it provides one of the most rapid and economic ways of turning vegetable food—including all sorts of waste and swill—into meat and animal fat; it can put on a steady pound per day and it is killed at the age, and therefore weight, appropriate for the market. The pig's ancestors—the European

J. Skeel

The Water Buffalo is both horse and cow to the Chinese, for it ploughs fields and provides food

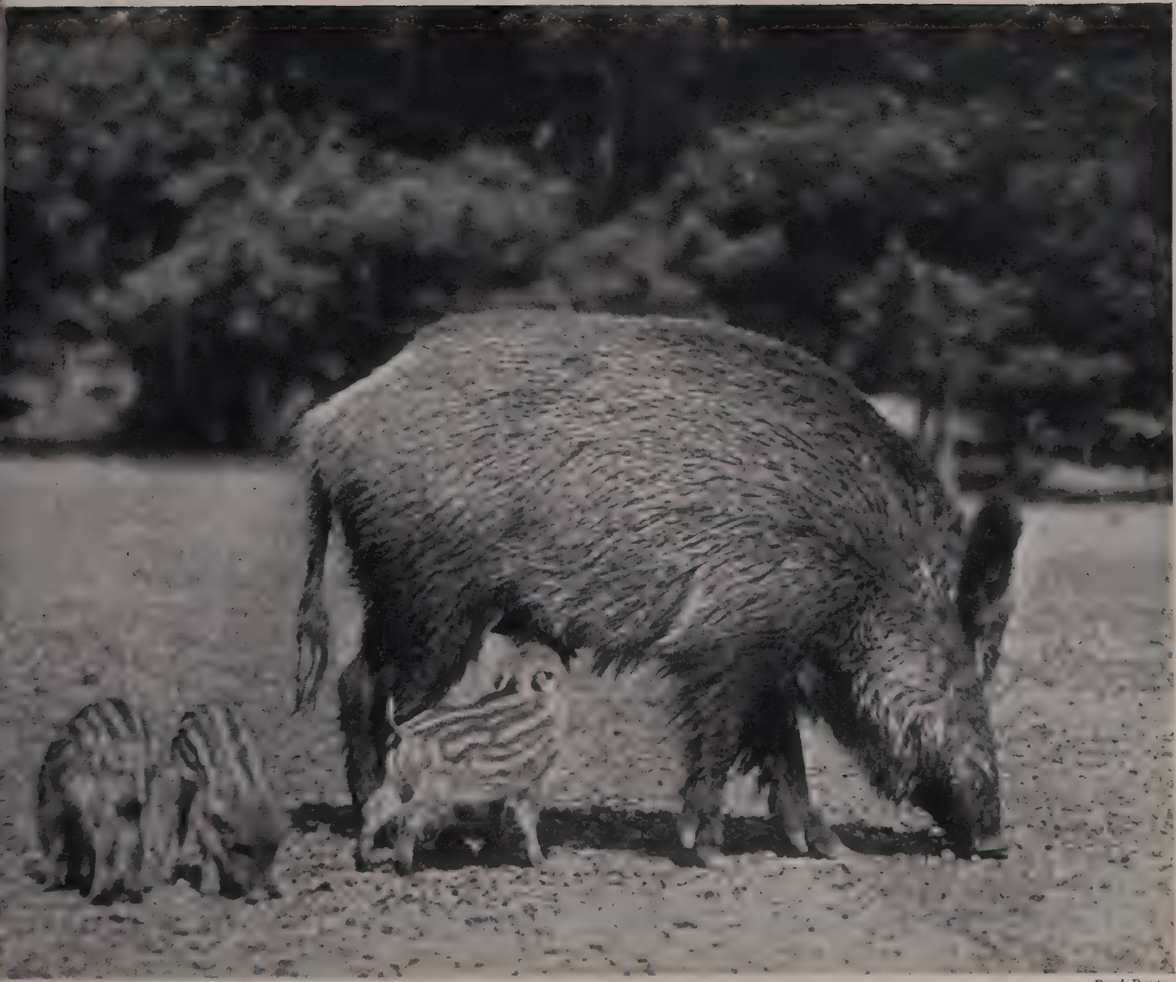
wild boar and the wild pig of South-East Asia—are omnivorous scavengers with a snout especially suitable for surface digging; these characteristics remain in the domesticated form, and (in view of the danger of infection) they are the real reason for pork being proscribed in Levitical law as food for the Israelites as well as being forbidden to other Mediterranean peoples. Modern selective breeding has developed over a dozen forms built on very different lines from the lean razor-backed hogs that had to hunt for a living. Perhaps the strangest thing is that the domesticated pig has completely lost the lateral stripes—really a series of dashes—that one finds in the young of every known wild pig. In some parts of the world, particularly in the South-West Pacific, pigs are often allowed to run loose around the villages, seldom if ever being penned, and they tend to revert to the original wild type; some indeed take to the woods and become completely feral.

The Reindeer has several distinctions. It is the only deer to be domesticated, it ranges much farther north than any related animal, living within and just outside the Arctic Circle, and it is the only deer in which both sexes have antlers. It is found in the far northern parts of both Old and New World, the wild form generally being called Caribou in America. It was tamed by nomads in northern Europe and northern Asia in very early times, several slightly different races being domesticated; much more recently domesticated Reindeer have been introduced into the New World. Chinese texts of some five centuries B.C. refer to deer being kept by the barbarians of the North, but while this probably referred to the Reindeer, there is some uncertainty, nor is it known whether they were used for carrying baggage, drawing

John Fursdon

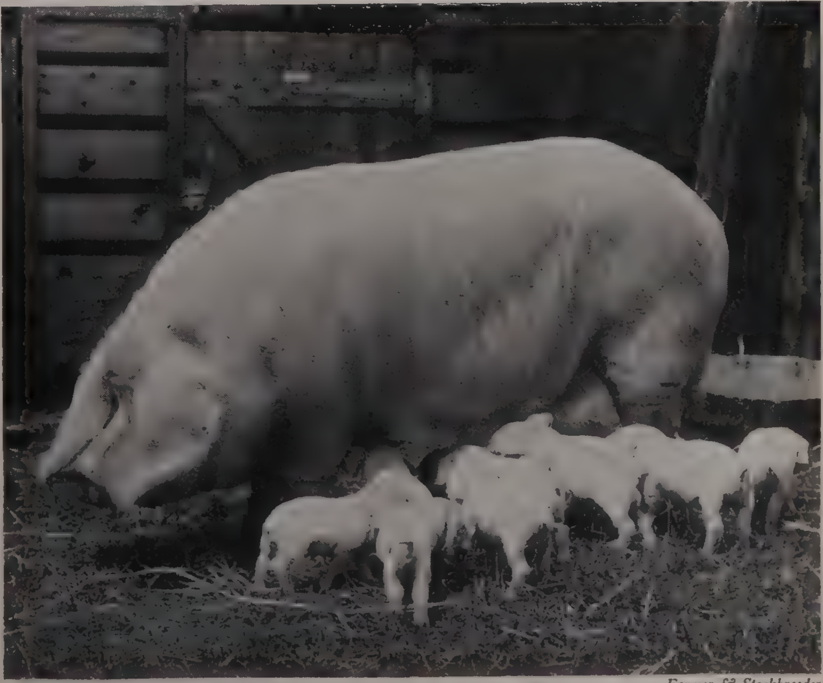
(Left) *A pair of little Soay sheep, whose thinly-fleeced bodies and long legs and horns indicate their relationship to the goats. They are found mostly in the Western Isles, where they are crossed with domestic sheep. A contrast* (below) *is made by this ram, a champion Southdown, whose selective breeding, concentrating on the finest fleece and mutton, has resulted in shortening the legs and the total disappearance of horns*

Farmer & Stockbreeder



Paul Popper

(Above) *A wild sow with her young. Though long extinct in England, wild swine are still found in France, Germany and in eastern Europe as well as Africa and Asia.* (Right) *Again careful breeding has developed the most valuable features of the domesticated sow and her litter. The stiff, wiry hair, and stripes have gone, and the size of the body and quality of the pork have increased. Note the difference in numbers between the two litters*



Farmer & Stockbreeder

sleighs and, as in Siberia, for riding. Reindeer are specialized feeders, largely depending on reindeer moss (*Cladonia rangifera*), a lichen found throughout the tundras; they can find it under some three feet of snow and dig down for it. They live in large herds—always in the open—watched over by their owners and it is estimated that these herds total some 1,500,000 head. They are valuable also for their milk and meat and the introduction of Reindeer into parts of Scotland has been considered more than once.

The tame rabbit has two common uses, the production of food and fur, but it is also a very popular pet among children and is of some value as a laboratory animal. All tame rabbits are descended from the European wild rabbit which was originally a native of Spain where the Romans domesticated it early in the present era. The large litters, early maturity (about six months) and fairly short gestation period have all been factors in producing the almost fantastic assortment of pedigree rabbits now kept in Great Britain. The well-named Flemish Giants may weigh up to about twenty-one pounds against about three pounds for a wild rabbit, while Angora and Blue Beveran are rightly classed among the 'fancy' breeds. Most of these varieties are of recent origin and the rabbit, as a species, is obviously very fluid, easily producing sports, or mutants.

The growth of the comparatively new business of fur-farming is of particular interest for in it one can see several distinct stages of domestication, from the pure wild form simply confined on the one hand, to a wide range of colour-varieties, very different from the wild animal and fully fixed as breeding forms, on the other. The Coypu, yielding the thick, more or less waterproof fur generally known as "nutria", is the best example of the first group; an inhabitant of the waterways and swamps of South America it has shown

Coypus, South American rodents about as big as hares. They are vegetarian and, in spite of their size, are harmless. Bred for their waterproof underfur, they normally inhabit rivers and swamps

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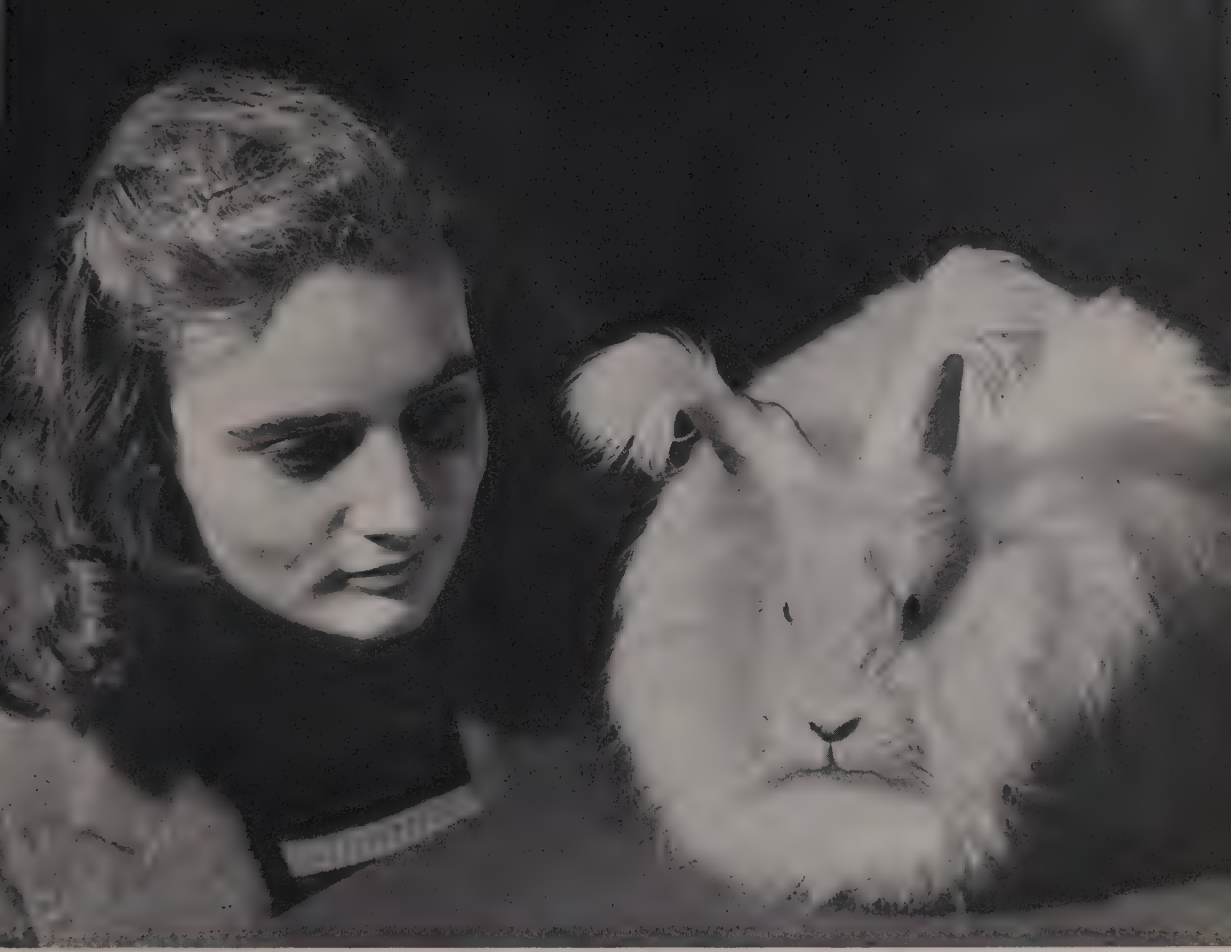


Fox Photos

This pampered puff-ball is an Angora rabbit, and is highly valued for its fur. Carefully and delicately farmed, it would have no chance of survival fending for itself in natural surroundings

itself able to settle down and breed freely in suitable habitats in the northern hemisphere, including the British Isles. It is notable in having a gestation period of no less than 140 days, an almost fantastic length of time for a rodent, especially when compared with only thirty days for a hare, of about the same size. No colour-mutants seem to be known for the Coypu, but in the somewhat similar Musk Rat from North America a black form is more valuable than the natural brown. This Musk Rat, rather like an oversized Water Vole, was first imported into Great Britain to found fur-farms, but it settled down so well and established itself so firmly in several valleys, notably the Severn and the Arun, that it threatened to do serious damage to the banks; it was therefore reclassified as an undesirable alien and a special law (22 & 23 George V C.12) now forbids its importation and aims at its extermination.

At the other end of this group of fur-bearers are the Silver Fox and Mink, scarcely different in form from their still wild North American cousins, but now showing a number of beautiful colours some of which, especially in the Mink, fetch almost unbelievable prices. These colour-forms have been obtained by selective breeding through mutants, a rather simpler task than in many breeding experiments, for the only real factor to be considered is the coat. A recent estimate of the output of Silver Fox pelts from North American 'farms' was 200,000 per annum.

A new recruit to the fur-bearers is the Chinchilla, a most exquisite burrowing rodent from the slopes of the Andes, whose hair is the softest and finest animal fibre known to commerce; in its homeland it has been hunted almost to extinction, but it appears to be safely established on fur-farms in the Southern States and is thus well on its way to becoming domestic. It is a stocky little creature up to about a foot long, with a short, rather stiff

Slave labour! Once in these batteries a chicken becomes merely a living machine turning poultry food into eggs. An exact science, hen-breeding never risks the fallibility of the hen: eggs, when selected for hatching, are assisted by artificial incubation

armer & Stockbreeder

tail, and to preserve its wonderful coat it has a very specialized cage so designed that the fur cannot be soiled. In captivity it seems to approach the tabloid-eater so long promised by advanced scientists, for it is fed entirely on small dry pellets of a specially compounded vegetarian mixture.

It is perhaps hardly correct to include the Ostrich here, but it approaches as near to fur-bearing as a bird can. It may be a little difficult to appreciate the volume of the trade in Ostrich feathers a few decades ago, when a single lot in one of the twice-weekly auctions at Port Elizabeth would be knocked down for as much as £25,000, and when London wholesalers handled ten to fifteen tons of feathers a month. The fashion for Ostrich feathers goes right back to the Pharaohs; up to about 1870 feathers were obtained by hunting, but a Boer got the idea of starting farms for the world's largest bird. Very soon these farms were springing up all over South Africa and also, in spite of a vigorous export ban, in California, Australia and Southern Europe. By about 1920, however, fashions had changed and most farms had to be abandoned, though the Ostrich is still to be found living in captivity and serving man.

When we turn to other birds, we find that a very large proportion of them come under the heading of farmyard birds, that is those whose whole *raison d'être* is the production of meat and eggs. Of these the common fowl with its many breeds stands out in importance, its world output of both meat and eggs far exceeding all others combined. It enters the human scene quite late, not being found at all in Neolithic remains and having no mention in the Old Testament. It appears towards the end of Ancient Egyptian civilization, apparently introduced by the Greeks, and by the 1st century B.C. the Romans had developed half-a-dozen different forms and had even invented artificial incubation. It is fairly generally agreed that the Red Jungle Fowl of India and Burma, little bigger than some bantams, is the wild ancestor of the great range of specialized modern fowls. Selective breeding has produced not only a range of table birds and layers, but among the latter, sex-linked characters which allow the hens to be picked out as day-old chicks.

The Guinea-fowl is one of the very few African contributions, and in spite of 2000 years of domestication, it is hardly distinguishable from the wild Guinea-fowl of the open woodlands of Central Africa. In a Greek fable the sisters of Meleager were changed into Guinea-fowl and the plumage is said to show the tears they shed until they died; this fable is commemorated in the scientific name, *Numida meleagris*. The Romans seem to have been very interested

It is many years since Ostrich feathers were considered fashionable, but even now many of these largest of all birds live in captivity. Natives of Africa, they have distant and smaller cousins in the South American Rhea and the Australian Emu and Cassowary

By courtesy of South African Railways

in Guinea-fowl and kept at least two species, one of which has now been lost to domestication.

The turkey is the only North American animal to be fully domesticated. It came to Europe in the 16th century and tradition alleges that it made its first formal appearance at the wedding feast of Charles IX of France in 1570. Turkeys are found from Canada down to Mexico and it is the southern form, very little modified, that now forms the traditional basis of Christmas dinner.

The goose appears early in the ancient record, much earlier than the fowl, though it is rather hard to say just when it became fully domesticated. The Greeks kept it, for Homer in the Odyssey speaks of eagles stealing domestic geese; both Chinese and ancient Indian records also include it, so that it was probably brought into domestication in several different places. Most breeds of goose stem from the wild Grey Goose which they still resemble in many points. Geese are normally kept only for their meat, but they have one unique virtue—they are grazers and for much of the year are content with nothing but grass. Ducks came into captivity considerably later than geese, though the reason for this is not at all clear as in very early times they were known as objects of the chase. The common Mallard, found over much of the northern hemisphere, is the stock from which the comparatively few varieties of domestic ducks have come and, like geese, they are valued as table-birds rather than as egg-layers.

A very different duck had been domesticated in Peru, and this was introduced to Europe by the Spaniards in the 16th century. It is now generally known as the Muscovy duck, an adjective which refers not to its origin, but to the musky odour of the flesh at certain seasons.

Two insects must be included among the domestic providers of goods. The silkworm was cultivated in the early days of ancient China, and it is known that Si-ling, wife of the famous Emperor Huang-ti (2640 B.C.) encouraged the industry. Silk production remained a monopoly of the East until some silkworm eggs were successfully smuggled to Constantinople about A.D. 550; this was the source of all the European silkworms, some of which first came to England during the reign of Henry VI. The invention of rayon, nylon and other modern synthetic fabrics has had a profound effect on the silk trade, but pure silk remains in great demand for many purposes.

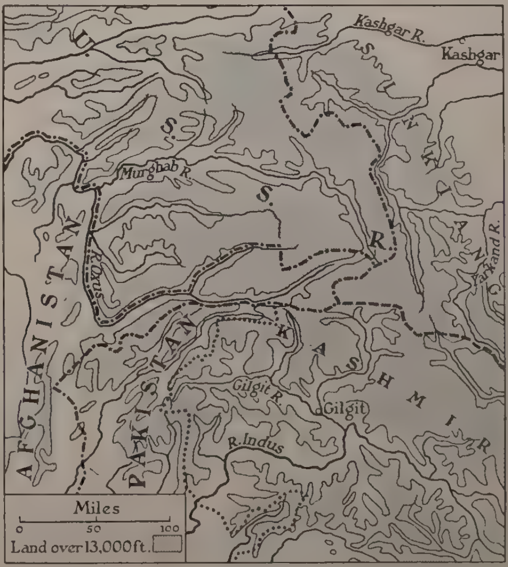
Bee-keeping probably goes back even further, for a bee is shown as a hieroglyphic in an Egyptian sarcophagus of the year 3633 B.C. In recent years the honey industry has been tremendously developed in Australia, New Zealand and North America.

The Kashgar-Gilgit caravan trade route ends at a suspension bridge across the swift Gilgit river

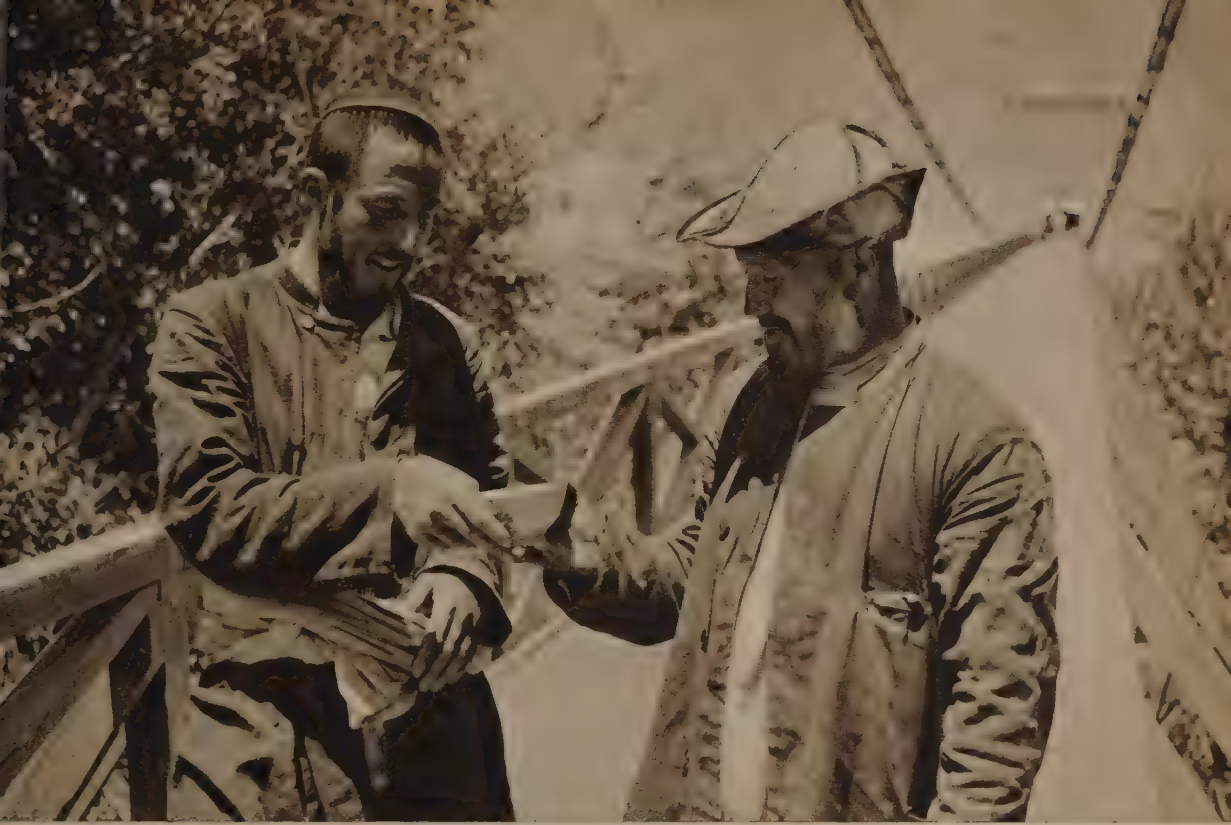
Gilgit Bazaar

Notes and Photographs by PETER GOODWIN

From Finland to Korea, an immense arc is overhung by the 'Iron Curtain', which traffic only penetrates at certain points. One of these, close to Kashmir's northern frontier where empires meet, is the town of Gilgit. Along the main Central Asian trade routes from Russia, Afghanistan, China, Tibet and Kashmir, the laden mule trains plod weary distances over the high mountain passes into its crowded market. Gilgit bazaar is like any other small shopping centre in the East, with narrow lanes and mud huts full of an indescribable collection of goods. Precious Khotan carpets, Chinese silks, rare Russian china and bright cloths, brought by traders from Kashgar and central Asia, are mixed with bazaar wares from India and Pakistan. Pakistan, however, also brings in, both by air and by road, supplies of food and other necessities of life in this remotest of remote valleys

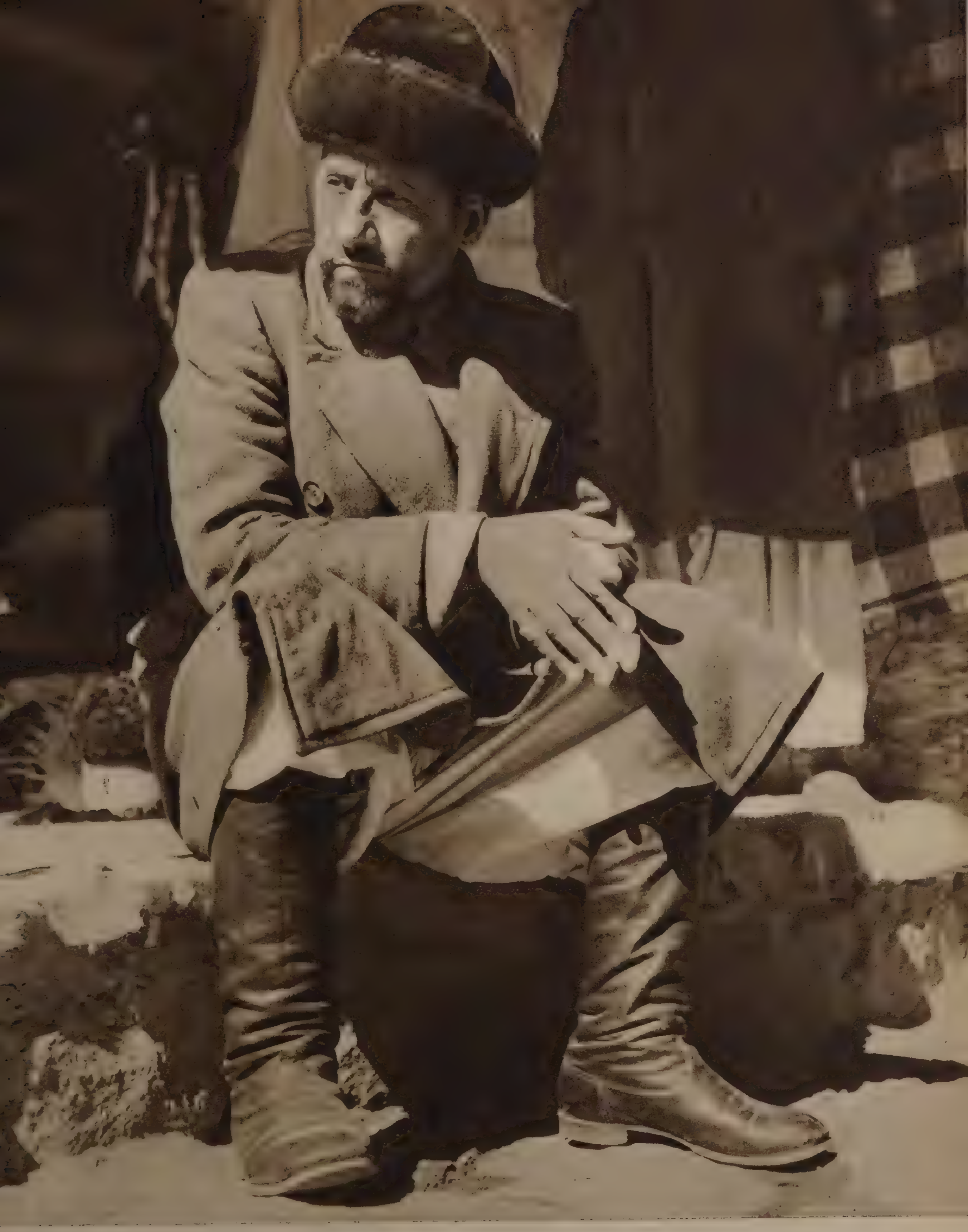


A. J. Thornton

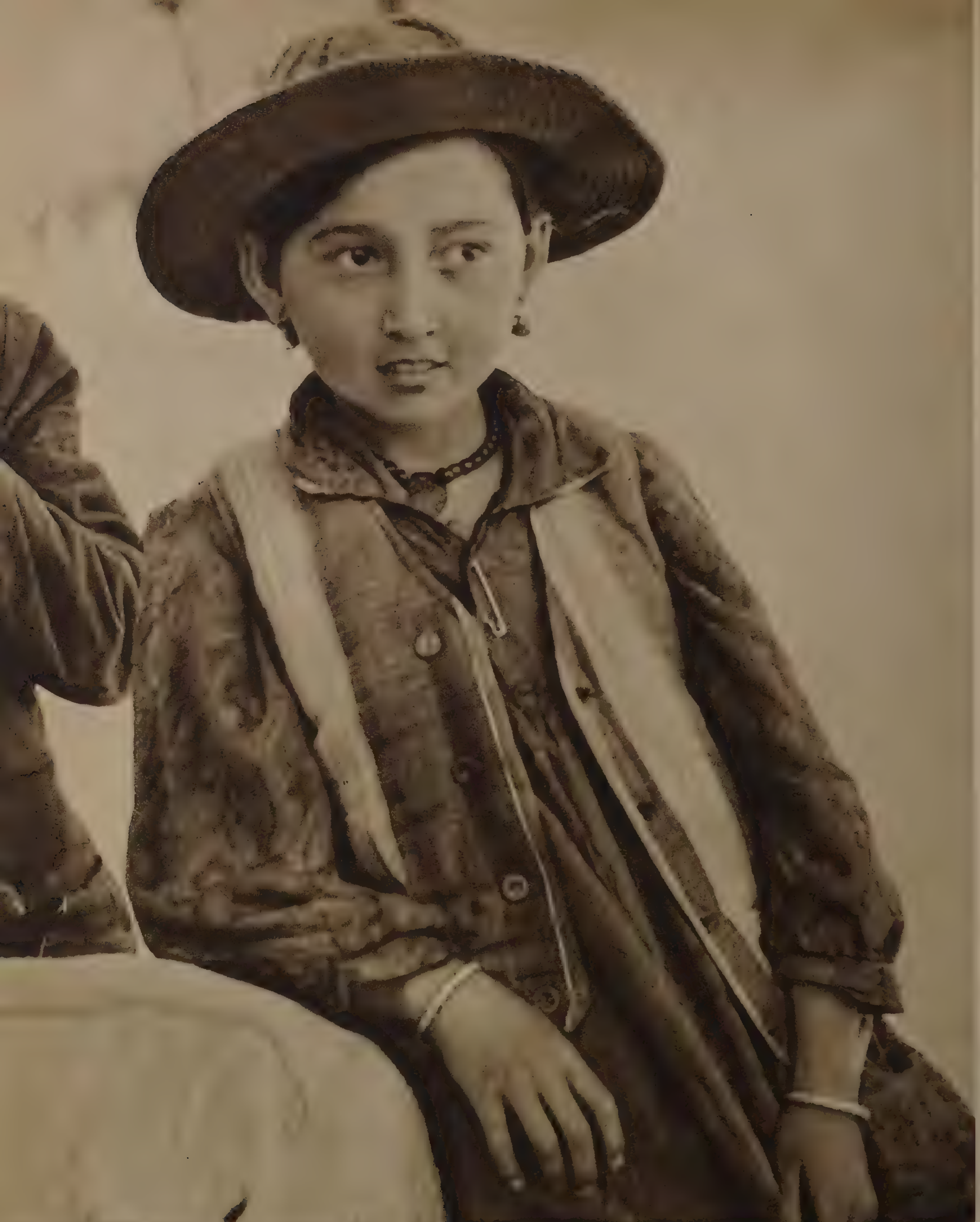


Crossing the suspension bridge into Gilgit, a Kashgari trader shows another merchant a beautiful piece of old Russian china which he proposes to sell in Gilgit bazaar. The remainder of his caravan has crossed and rests along the tree-shaded river bank after their six weeks' trek over difficult mountain terrain

Tartars are excellent horsemen, and their steeds swift, wiry, and sure-footed; this trader and his sturdy mountain pony have just completed the 400-mile journey from Kashgar in Sinkiang

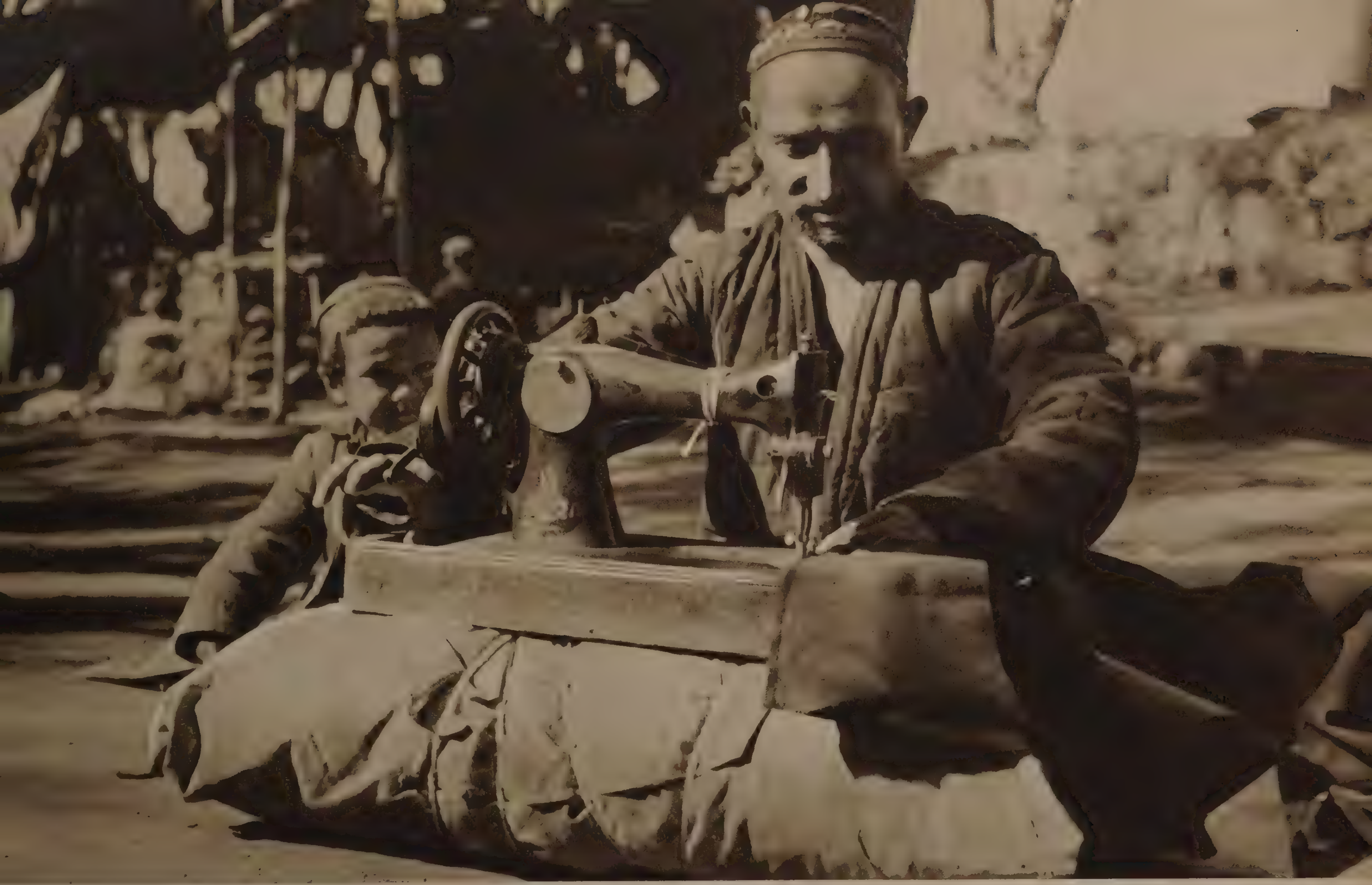


In Kashgari fur cap and Russian top-boots, Khalifa Jan, a well-known trader in Gilgit bazaar, sits outside his shop in the sun. In the winter months it is much too cold to sit inside

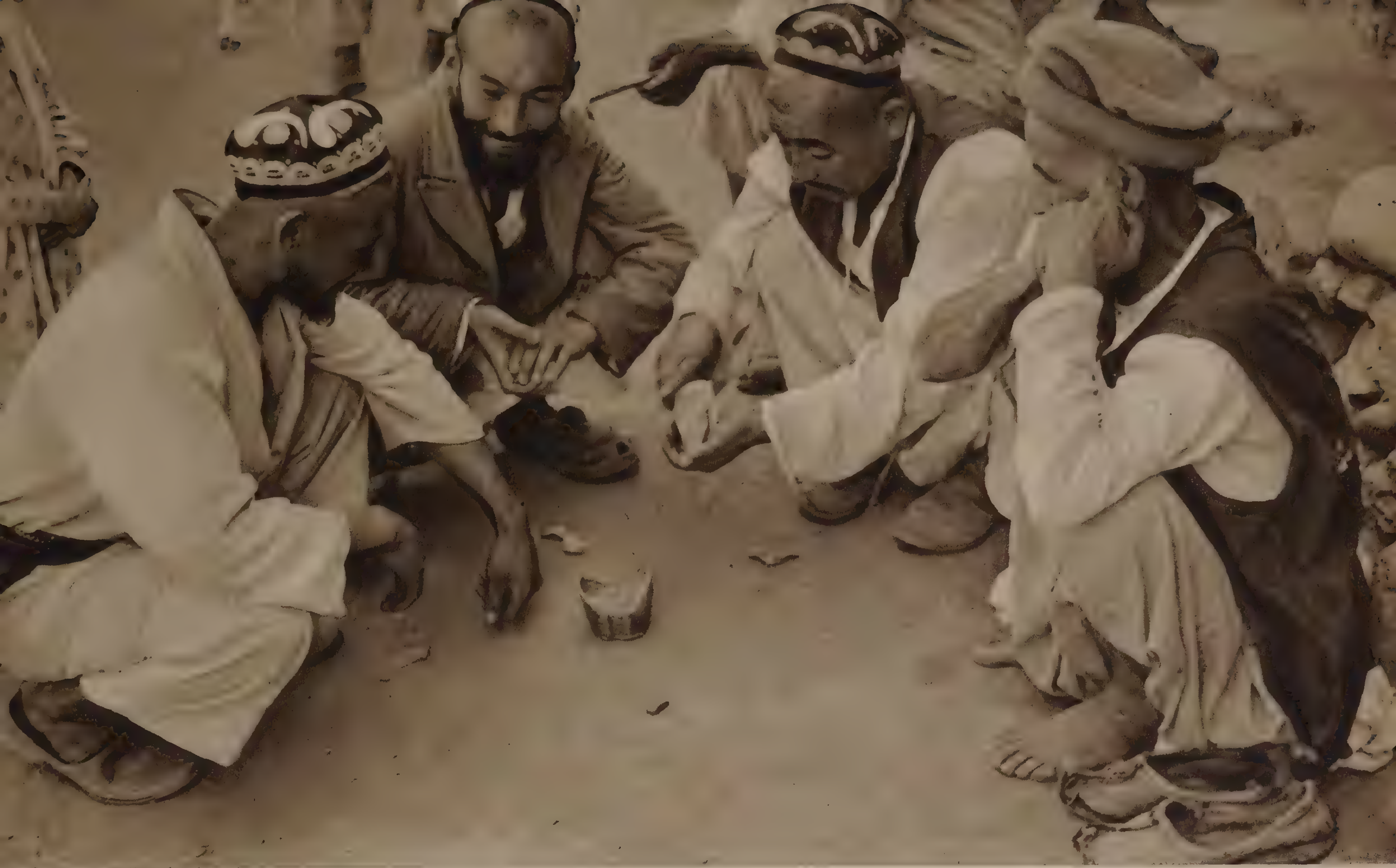


Though she shows hardly any sign of fatigue, this very attractive Kashgari girl has travelled with her family caravan from Sinkiang. Her necklace is coral and her hat Kashgari

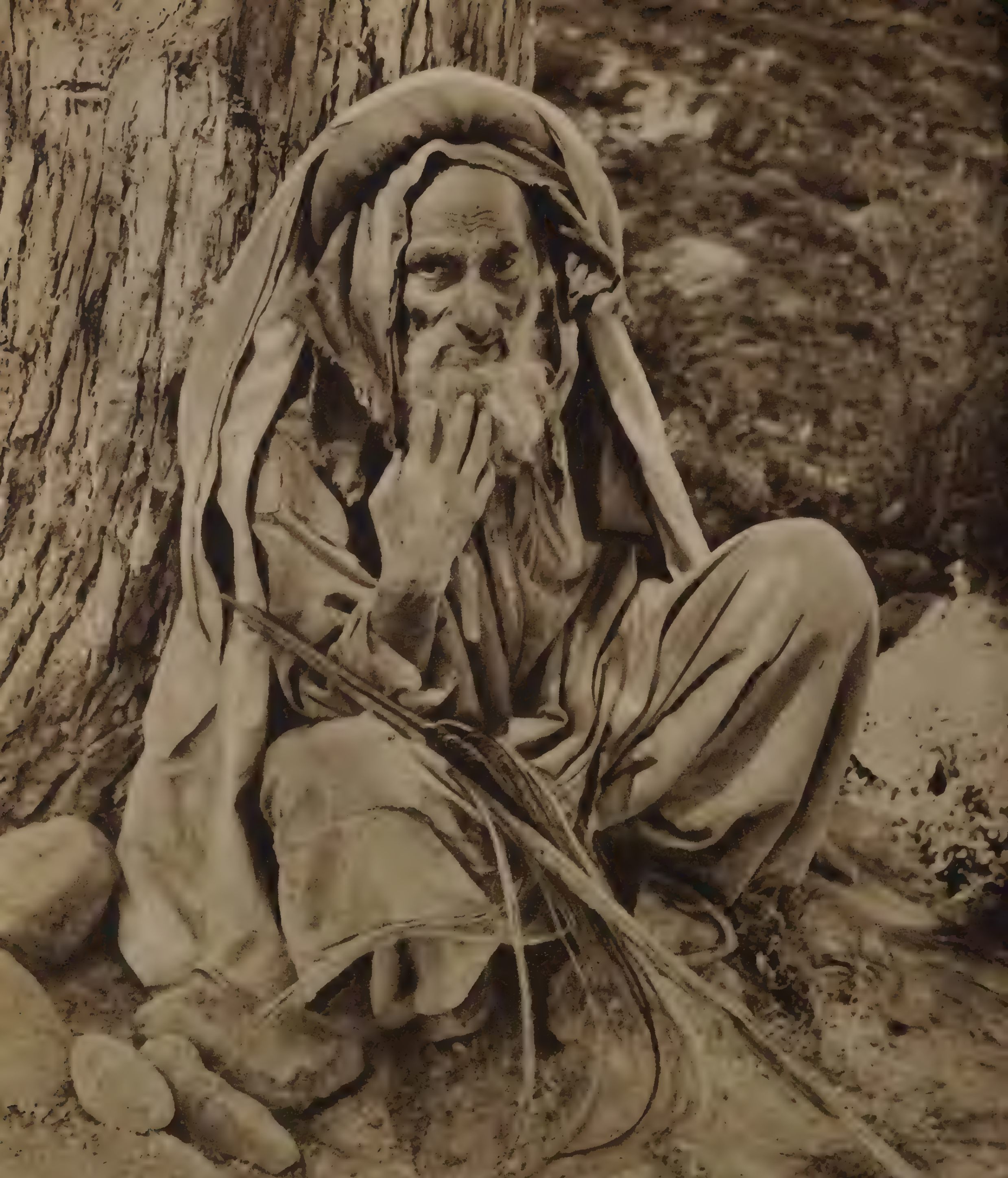
Most Kashgari traders, like the one shown here among his wares in Gilgit bazaar, are cheerful individuals, always ready to crack a joke. Nearly all wear Kashgari embroidered skull-caps



Complete with a sewing machine left behind by the wife of a British political agent, this Kashgari does a thriving business in Gilgit bazaar



Kashgari traders take time off to gamble with a Gilgiti (on the right). One of the Kashgaris (third from the left) has lost and is paying up

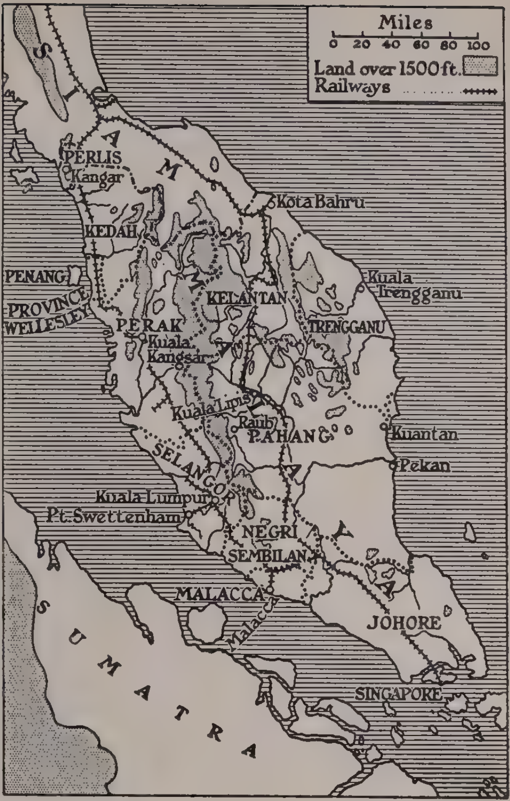


Though this patriarchal Gilgiti did not know his correct age, he was certain he had passed the century. Hale, hearty, and a model of serenity, he cannot remember ever having been ill

The Chinese in Malaya

by F. SPENCER CHAPMAN

In August 1950 we published an article by the late Mr Ian Morrison describing the Malays who are now, numerically, the second community in Malaya. Colonel Spencer Chapman, whose war-time exploits in Malaya are well known through his book The Jungle is Neutral, *shows how the Chinese came to occupy their predominant place and how Communism acquired roots among them*



A. J. Thornton

The months just before war came to Malaya, I spent on Singapore Island training guerillas. The months immediately after war left Malaya, I was Civil Affairs Officer at Kuantan, half-way down the east coast of Malaya. The years between I spent roaming the jungles of the peninsula, occasionally with small parties of British, usually sharing a camp with 50 to 100 Chinese. For over a year of this time my three British companions, in a succession of Chinese camps, were a tin-mining engineer and two Chinese-speaking officials from the peacetime Malayan administration, one from the Police, the other from the Civil Service. So I had ample opportunity not only of observing at closest possible quarters a cross-section of the Chinese in Malaya, but also of discussing their history and characteristics with experts.

For two years before I joined forces with these three British officers, I had (after the fall of Singapore made sabotage and active resistance impracticable) travelled from camp to camp in Perak, Selangor, Pahang, Negri Sembilan and Johore, helping the Chinese with their military training and carrying on our common struggle to keep alive and out of the hands of the Japanese. We lived in miniature villages consisting of bamboo and palm-thatched huts surrounding a small parade-ground, a few miles in from the edge of the jungle. Our food consisted of rice adulterated, to make it go further, with sweet potatoes or tapioca, and anything we could obtain to give it flavour: jungle-pig, monkey, mud-turtle, snake, bamboo-shoots, root vegetables and even fried potato-leaves. We were chased from camp to camp by the activities of the Japanese or their informers, and we suffered from beri-beri and jungle ulcers as well as from malaria and other malignant fevers.

In all these vicissitudes the Chinese showed extraordinary resilience and capacity for 'taking it'; and if they fell into the hands of the Japanese they would endure the most terrible tortures before divulging any information. I have nothing but praise for their cheerfulness, courage and endurance.

These Chinese came from Hainan, Canton, Swatow, Amoy and even from as far as Shanghai. About two-thirds of them had been born in Malaya (these are usually known as Straits-born Chinese). But although the blow-pipe hunting Sakai (the generic name given to all the aboriginal inhabitants) had freedom of access to our camps, and even an Indian or two might be found therein, I did not see a single Malay in the camps of the self-styled "Malayan Peoples' Anti-Japanese Army".

The reason for this anomaly is the key to the whole problem of the Chinese in Malaya.

The Chinese came to Malaya from the earliest days as traders, but they only began to settle in small numbers after the Portu-

l photographs from the Central Office of Information

Malaya's economic potential and British administration offer great opportunities for immigrant Chinese enterprise. The towns bear the stamp of Chinese builders; streets and shops (opposite, above) *are thronged with Chinese tradesmen: vegetable-women in bamboo hats, a hawker of hot snacks carrying his portable charcoal fires;* (opposite, below) *diners in one of the roadside delicatessen shops; and* (right) *two ironmongers, who make their own pots and pans. All this is part of a pattern of life, slow to change, brought from Southern China*

guese conquest of Malacca at the beginning of the 16th century. During the Dutch régime which followed, their numbers increased slowly but it was not until the establishment of British settlements, first at Penang, then at Singapore, and the resulting freedom of trade, that they started to grow from a minority of two or three thousand until by 1941 they had increased to 2,500,000, thus equalling if not outnumbering the Malay population.

Without the help of the Chinese, and to a lesser extent the Indians, Malaya, whose interior jungles were virtually uninhabited, could never have developed. The Malays are a delightful people, loyal to their Sultans, proud, brave and versatile, but they see no reason to devote their lives to the amassing of wealth in industry or commerce. The Chinese, on the other hand, are ambitious, industrious and enterprising. Trade, then the development of tin and later of rubber attracted them to Malaya in their thousands.

The Chinese at this stage were interested primarily in trade and commerce; in the main they left their wives and families in China, and thither much of their wealth was sent. Except for the feuds between the various Chinese secret societies, which occasionally developed into gang fights, they did little to interfere with the rest of the community, and the problem that they presented was small in comparison with the suppression of piracy and slavery among the Malays and the control of internal wars between the Malay Sultans as well as civil wars between rival claimants to a throne. It was largely to deal with the problem of the secret societies that the Chinese Protectorate was formed in 1877, but it soon concerned itself with all aspects of Chinese life in Malaya including control of immigration, labour and welfare.

Both Malays and Chinese prevailed upon the British to cease from avoiding commitments in the Malay States and to intervene in the interests of peace and security. In this way order gradually emerged from chaos, and the Malay Sultans agreed to accept the help of a British Resident whose advice was to be acted upon in all questions other than those touching Malay religion and custom.

All that the majority of Chinese wanted in the years preceding the Japanese invasion was a peaceful Malaya in which they could continue to develop the tin mines and rubber plantations and to acquire large fortunes in trade and commerce. And as fine roads and railways replaced jungle tracks, and law and order took the place of piracy and slavery, there were few complaints against the British administration. Representative government gradually developed, especially in the Straits Settlements which were British territory as opposed to the Protectorates of the Federated and Unfederated Malay States. Although an increasing number of Asiatics were employed in the public service, only the Malays, a handful of Eurasians and an increasing number of Straits-born Chinese regarded Malaya as their native country, and few of these had any experience of self-government or even any desire to vote.

By 1941, the year I found myself at Singapore, virgin jungle and swamp still covered four-fifths of Malaya, but the remaining fifth had been changed by agriculture and tin-mining and a network of roads and railways to one of the most prosperous countries in the world; and the whole country, from the great cities of Singapore, Penang and Kuala Lumpur to the smallest Malay *kampong* or village, reflected the British virtues of order, justice and health.

It was difficult indeed to fulfil our obligations under the treaties to protect the Malays from the more energetic immigrant races, and at the same time to guarantee equal opportunity for all groups; but this was achieved by means of land reservations, preference in government employment, and educational privileges. The Straits-born Chinese, who form about two-thirds of the Chinese population, had cut themselves off from China but were not yet accepted as citizens of Malaya. Consequently they began to identify themselves with the political groups of the immigrant Chinese, particularly the Kuomintang and the Chinese Communist Party.

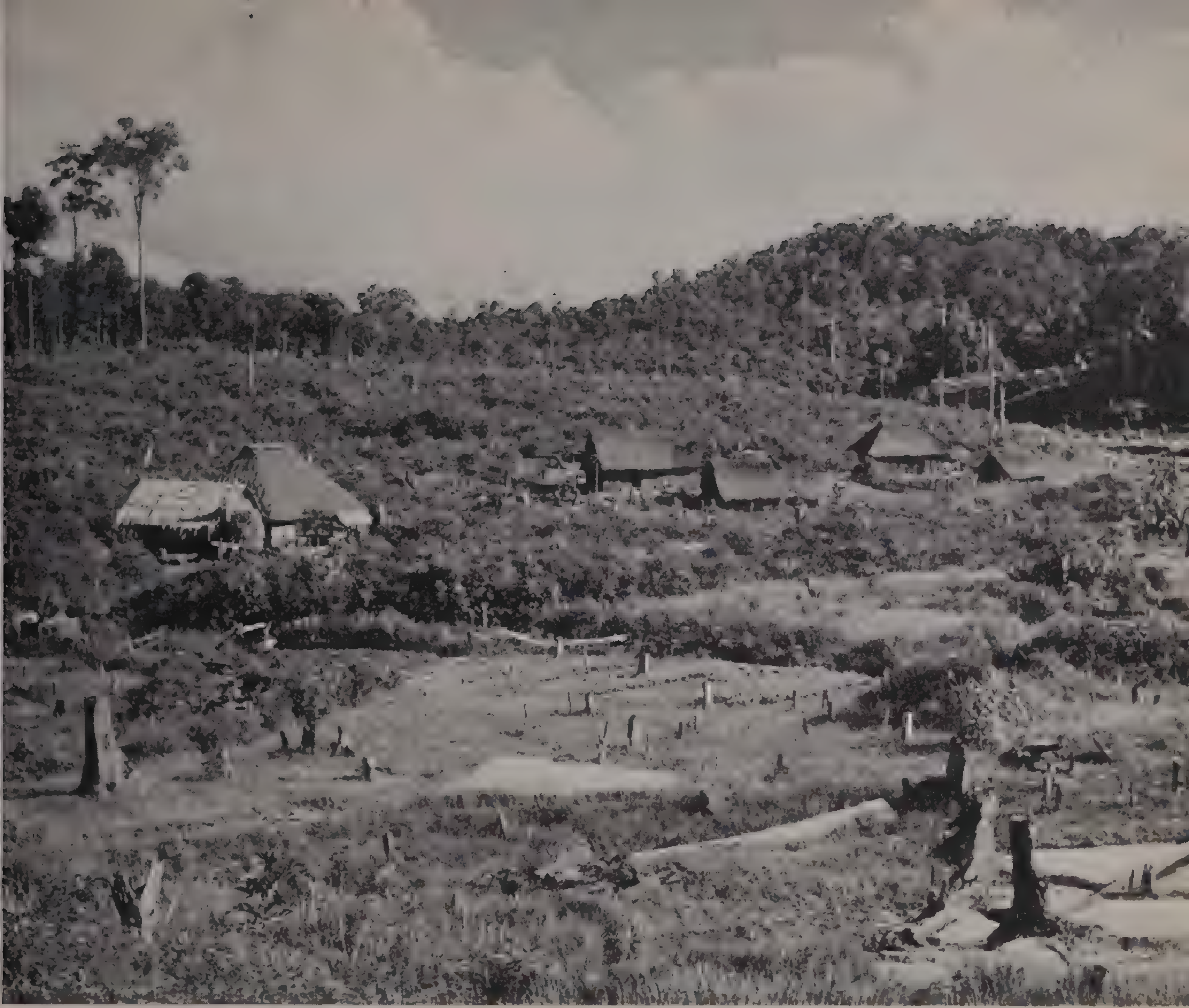
When the war with Germany broke out in 1939 it was decided that Malaya's job was to increase production of tin and rubber to feed the war machine and to enable Britain to obtain much-needed U.S. dollars; and it was only after the fall of France and when Japan entered the war that it was realized that Malaya might become directly involved. After the purely military tragedy of the fall of Singapore, the administration was often blamed for not having armed the Asiatic population in Malaya, particularly the Chinese who had, after all, been fighting the Japanese in China for four years. But for decades the British Government had been trying to wean the Malays from war and piracy to pursuits of peace, and to arm the Chinese as well as the Malays, even if the equipment and training facilities had been available, would have been asking for trouble.

Before Singapore was bombed on December 8, 1941, a Patriotic War Fund had been started in Malaya and to this the Chinese were by far the largest subscribers; and during the invasion the Chinese assisted the Allied cause in every possible way. Most of the A.R.P. wardens were Chinese and they, together with the Local Defence and Volunteer Forces, helped as far as they could to check the looting and lawlessness that were inevitable during the interregnum between the disappearance of the British and the arrival of the Japanese.

The Japanese regarded the Chinese, particularly the Chinese Communists, as their implacable enemies: it was they who had opposed them most effectively in China with their mobile guerilla tactics and scorched-earth policy. And it was the Chinese who suffered most at the hands of the conquerors. Thousands were murdered; lorry-load after lorry-load of Chinese youths and girls were driven away from their homes, and were never seen again. About 50,000 Chinese were put to death by one means or another in the anti-Communist purge which took place in Singapore soon after its capture, and after this the Chinese leaders were made to collect a "gift" of 50,000,000 Straits dollars (about £6,000,000 sterling) for the Japanese war effort. This was only the beginning of a nightmare régime of bribery, corruption and uncertainty during which everyone who did not flee to the jungle and who was not working for the Japanese had to engage in black market activities in order to keep alive.

The Chinese hatred of the "barbarian dwarfs" was increased a hundredfold, and many who had lost everything—worldly possessions as well as family and friends—were ready to resist the Japanese to the uttermost.

Two kinds of resistance groups were formed: the armed guerillas, known as the Anti-Japanese Army (A.J.A.), who formed camps in the jungle, and a much larger organization, the Anti-Japanese Union (A.J.U.), whose members lived openly in the towns and kampongs and who resisted the Japanese in a variety of subtle ways—of which the Chinese are past-masters—as well as assisting the guerillas with money and supplies.



In the Malayan countryside, both capital and labour in staple tin and rubber industries are largely Chinese. Life is very overcrowded (right), *but the Chinese do not seem to mind. "Squatters" pioneer the jungle* (above) *for timber, and try, with less success, to win its poor soil for farming. Such isolated colonies maintained anti-Japanese groups during the war and have, since 1948, been forced to support terrorist gangs. The government has now started resettlement schemes in country clear of the jungle*

There was a small resistance movement among the Kuomintang Chinese, but the great majority of Chinese guerillas were controlled by the Malayan Communist Party.

Now the M.C.P. had originated in 1928 when the Kuomintang in China had been purged by Chiang Kai-shek of its Communist elements, and the Malayan Kuomintang party had followed suit. In spite of its name the M.C.P. consisted almost entirely of Chinese, and its activities were confined to organizing strikes and fostering discontent among Chinese workers in Malaya. In 1940, when war was approaching Malaya, the M.C.P. was instructed by its head office in China to cease anti-British activities and to concentrate its efforts against the Japanese. Owing to Russia's double-faced behaviour in Europe, its position was somewhat anomalous until the Japanese invaded Malaya, and then the M.C.P. came out wholeheartedly on the British side.

I well remember attending, in December 1941, a rally in Kuala Lumpur (the capital of the old Federated Malay States) under the auspices of the Chinese Mobilization Committee, when both the Kuomintang and the Communist Party agreed to join forces to oppose the Japanese. It was too late to arm and train many of them, but a hundred young Chinese provided by the M.C.P. were trained at our guerilla warfare school at Singapore; and a thousand Chinese as part of "Dalforce" fought the Japanese in February 1942 in the mangrove swamps of Singapore Island and suffered severe losses.

The great majority of the Chinese in the jungle camps had joined the A.J.A. simply and solely to revenge themselves on the Japanese whose atrocities had added fuel to their smouldering hatred. But the control and organization was entirely in the hands of the M.C.P. whose avowed object, after driving the Japanese out of Malaya, was to establish a republic in Malaya. Their policy was anti-imperialist but not anti-British, and during the occupation they advocated complete cooperation with the Allied Forces. I, as well as several other British officers who were 'left behind' either acci-

These Malayan Chinese might be at the theatre in San Francisco's Chinatown : with no lack of money, town dwellers flock after work to cosmopolitan fun fairs, boxing rings, dance halls and cinemas

But the favourite big-town entertainment is the gaudy traditional repertory drama, a national institution, which, though in old-fashioned language, brings with it sentimental echoes of old China

dentally or intentionally, owe my survival to the solicitude of the Chinese.

The survivors of my own stay-behind parties had lost touch with any other unit of South-East Asia Command as our wireless communications had broken down. But in the summer of 1943 two British officers from an organization called Force 136 arrived in the country by submarine, and it was with these men that I joined forces on Christmas Day 1943 after I had already spent two years in the jungle. We soon got in touch with the central committee of the A.J.A., and an arrangement was drawn up by which the A.J.A. pledged itself to cooperate with the British, not only during the period of hostilities, but throughout the military occupation. In return we were to subsidize them, supply them with arms, ammunition and explosives, and provide British liaison teams to train them.

The absolute control of the central headquarters of the A.J.A. was only limited by the difficulties of communication. In each camp control was in the hands of a committee of three, a political leader, a military adviser, and a schoolmaster. The rank and file were not only taught to drill and how to use such weapons as they had, but were given a general education with a strongly Communist bias, and spent a great deal of time singing propaganda songs and acting propaganda plays. They were thus indoctrinated with Marxist ideology, and as the average age of the guerillas was only nineteen or twenty they had little other education or experience of life to enable them to maintain any sense of proportion. Their discipline was excellent, and as far as the A.J.A. was concerned there was no extortion or coercion.

The total strength of the A.J.A. by 1945 was 6000 to 7000 and they had been armed and trained by about 300 British officers who had been dropped in by parachute.

Chinese tolerance dislikes the exclusiveness of a single faith, and in Malaya even the Chinese Christians do not entirely give up their ancient social observances. At the Buddhist temple (opposite) *an individual man or woman can find solace, according to temperament, in a choice of abstruse philosophy, aesthetic appreciation, ritual worship, fortune-telling or a vegetarian lunch. But individual destinies are tied to family destinies, and the feeling of being part of the family—which includes even distant paternal relations and forbears long dead—is consecrated on certain festivals by large or wealthy families in clan temples* (right), *by the rest at altars in living-rooms, tended daily. Rites for ancestors were prescribed by Confucius (552-480* B.C.)

They were all ready to assist in the Allied invasion of Malaya; but the sudden surrender of Japan turned the projected invasion into a peaceful reoccupation.

How well I remember the tears of joy with which the returning British were welcomed by the Chinese in the towns and villages. The liberating forces landed early in September 1945. Shortly before that time, having got out of Malaya by submarine in May 1945, I was parachuted back into Pahang and had joined forces with the Force 136 liaison officers in that area. On September 3, we were the first British officers to enter Raub, a small gold-mining town, and two days later we astonished the Japanese sentries by driving into Kuala Lipis, the capital of Pahang. The Japanese were truculent, and refused to disarm, but we agreed to protect them from the guerillas if they would cooperate with us to prevent looting. On September 8 we were the first to enter Kuantan and next day met the Malay Sultan of Pahang at Pekan.

Those who had known Malaya before the war were conscious of a considerable change in the political atmosphere. Formerly, thanks to British influence, the Chinese and Malays had got on very well together. But now all this had been changed by the Japanese Occupation. At first the Malays had almost welcomed the Japanese as their attitude promised to put a stop to the economic and political encroachments of the Chinese; and the Japanese had used the Malay police force to suppress the Chinese resistance movement. But the astonishing clumsiness of the Japanese overlords soon antagonized the proud Malays, and shortly before the surrender the Japanese had deliberately fomented trouble between the Malays and Chinese.

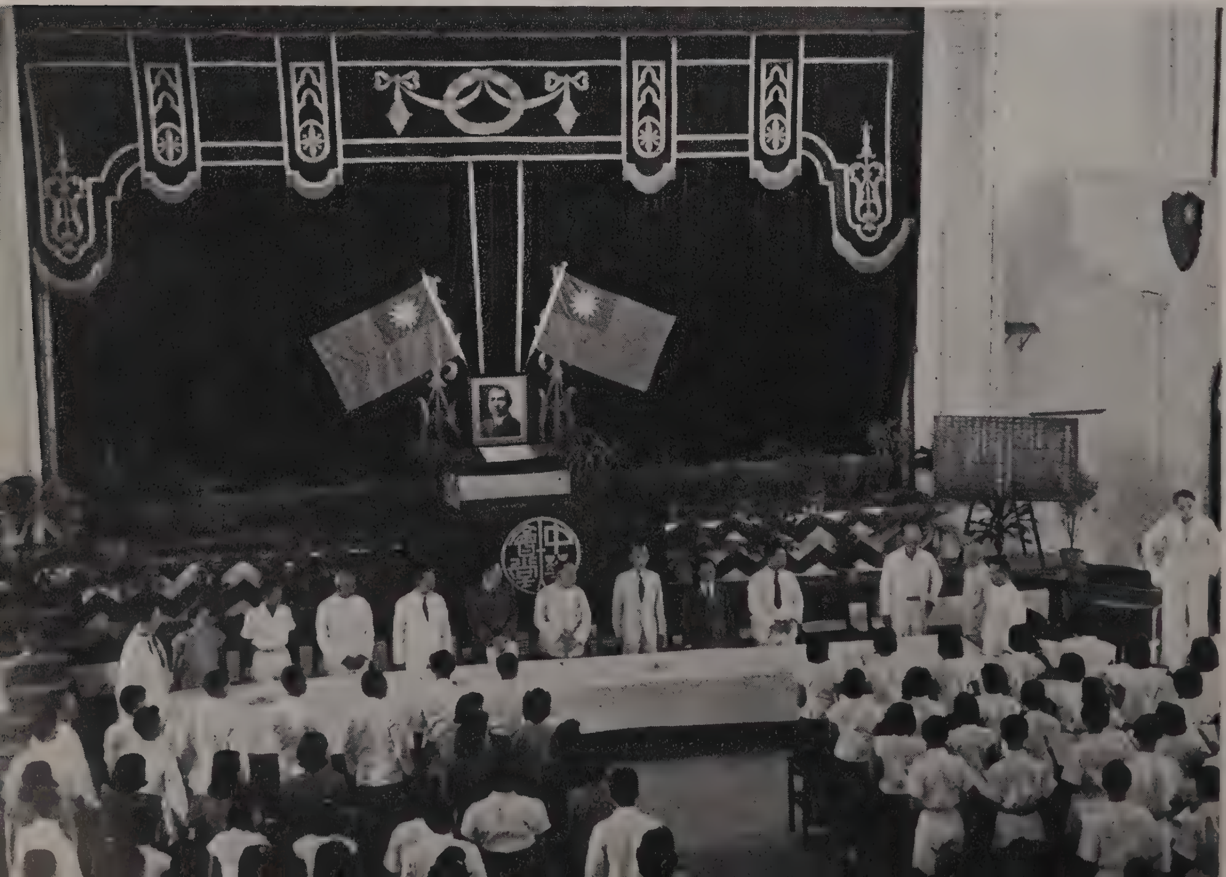
During the occupation the Chinese shopkeepers and traders had lost their leadership of the community. Those with money had been bled white and lived in obscurity in the kampongs at the edge of the jungle; if they remained in the towns they were suspected of collaboration and were probably liquidated by the guerillas. After the liberation the leadership passed to the Communist A.J.A. leaders who now emerged from the jungle in a blaze of glory. Thus it was that the leadership of the Chinese passed not only to the A.J.A., but to the A.J.U. which, unlike the former, was under no obligation to cooperate with the British Military Administration; and although the mass of the people were only longing for enough to eat and sufficient money to exist, the A.J.U. was bent on subversive activity.

The first task for the British Military Administration was to disarm the 6000 or so members of the A.J.A. including those who, owing to their remoteness, had not been brought in touch with the officers of Force 136. Early in December 1945 this delicate operation was successfully carried out: each man on handing in his arms and equipment received a gratuity. Altogether about 6800 men were disbanded and received gratuities.

The A.J.A. was thus peacefully disbanded, but the A.J.U., making capital of the serious shortage of food and the discrepancy between the cost of living and the wages of those who were lucky enough to have employment of any sort, continued to make trouble. Once more there were clashes between the Chinese and Malays as well as between Kuomintang and Communist Chinese; and even a Communist-inspired Malay Nationalist Party was found to exist. A series of strikes were organized and the Leftist press became more and more anti-British. A system of extortion and terrorism grew up which might have been considered as reasonable in wartime, but which could not be countenanced in times of peace.

Before the Japanese invasion the various national groups in Malaya had been held together by the British Government whose policy had been to fuse them, eventually, into a self-governing community. After the war a new plan to promote a sense of common citizenship was declared by the British Government. This policy of forming a new Malayan Union was too rapidly pursued. In October 1946, when I was Civil Affairs

The sense of still belonging to China is shown in this Victory Day celebration at Kuala Lumpur below the portrait of Dr Sun Yat-sen, founder of the Kuomintang and Father of the Chinese Republic



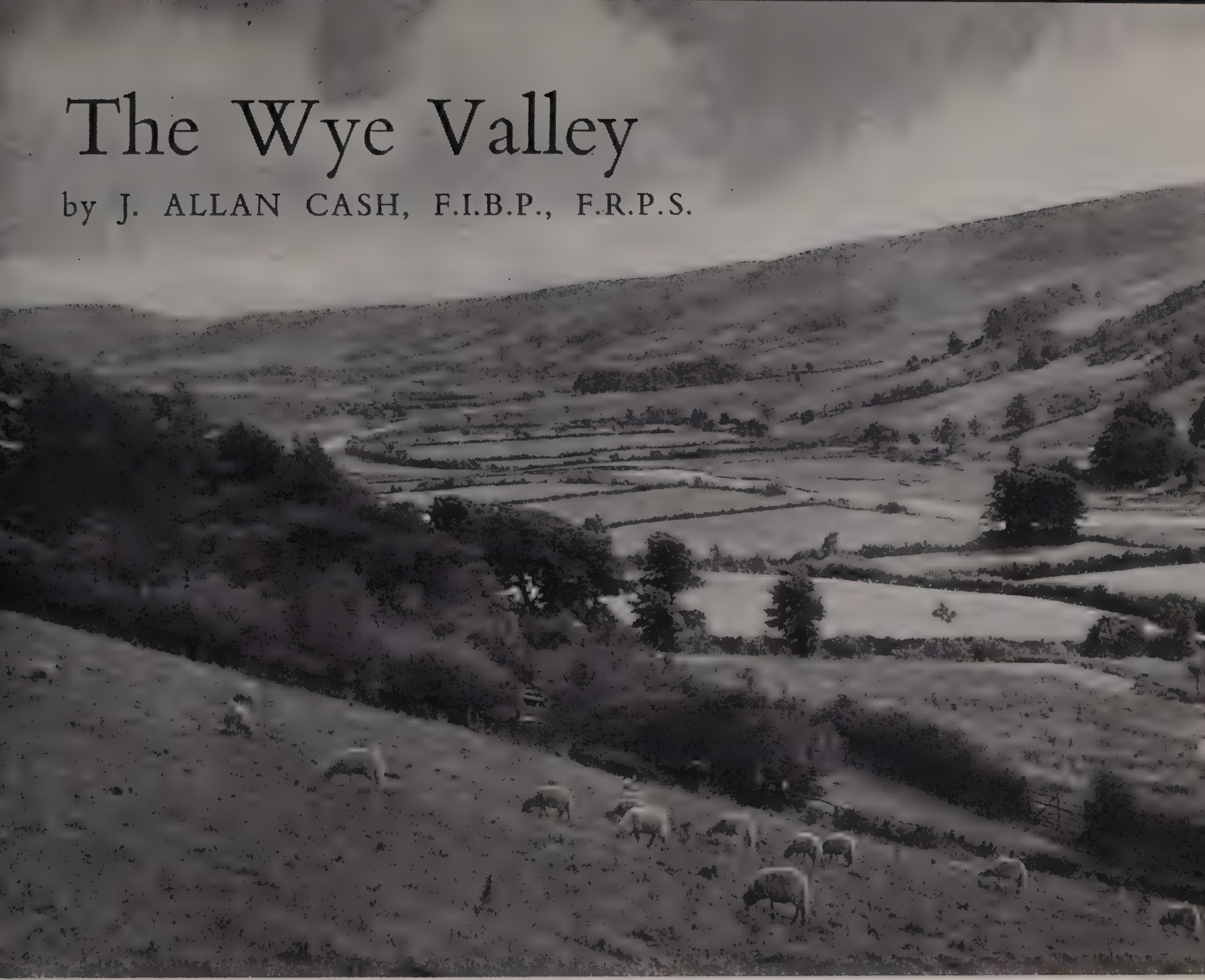
Thousands of young Chinese people entered for English-language schools, instead of Chinese schools, demonstrate encouraging eagerness to cooperate with other races through an international culture

Officer at Kuantan, Sir Harold MacMichael and his staff came to stay with me in order to visit the Sultan of Pahang who lived not far away at Pekan. The object of his visit to Malaya was to arrange new treaties with the Sultans. This new Malayan Union was to include the nine States of the Malayan Peninsula as well as the Settlements of Penang and Malacca. All who claimed Malaya as their homeland would have equal rights as citizens of the Union. Thus the Chinese, whether born in the Straits Settlements or the Malay States, would have equal status with the Malays in the Union. The new Union caused a tremendous outcry from the Malays as well as from certain sections of the Chinese and it was soon dropped in favour of a Malayan Federation. The A.J.U. have fled to the jungles of Malaya where their nuisance value is still considerable; but the 2,500,000 Chinese in the towns and countryside are only longing for peace and security so that they can continue where they left off in 1941.

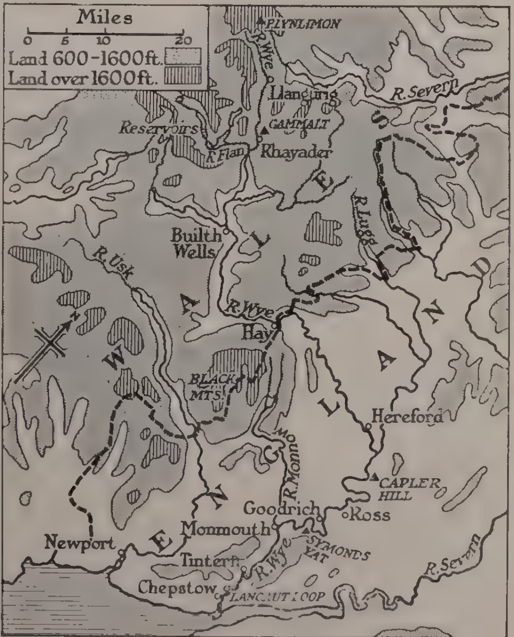
Chinese culture is remarkably resilient and history shows that the Chinese with their vast numbers, determination and adaptability, though sometimes conquered, have never lost their identity—even their Communists are primarily Chinese Communists. So in Malaya the Chinese have accepted a European system of government so long as it gives them freedom to make money and follow their own customs. But they have never lost their Chinese characteristics: their language, religion, social customs, and special ways of preparing and eating their food. As Dr Victor Purcell states in his book *The Chinese in Malaya* (p. 292): "The only solution of Malaya's problem is the unity in a common citizenship, independent of race, of all who claim Malaya as their homeland . . . Malaya has ceased for ever to be purely Malay; it is a plural society, and the race predominant in industry and commerce, in capital and in labour, in economics and in politics, is the Chinese. The Chinese in Malaya have come to stay."

The Wye Valley

by J. ALLAN CASH, F.I.B.P., F.R.P.S.



(Opposite) *The deserted slopes of Plynlimon, in central Wales. These hills, which are among the oldest in Europe, sprawl one against the other in everlasting lethargy, their shapes worn into a common smoothness by the wind and rain of many thousand years. Here is the source of the Wye: in its infancy the river forms a noisy and impudent contrast with the quiet solemnity of the hills, as it skips and trickles in and out of the long mountain shadows, and gradually swells as it approaches the junction with its larger tributary, the Afon Tarenig, near the main road west to Aberystwyth. This region is sparsely peopled, the desolation and solitude of the hills being occasionally punctuated by small flocks of sheep plucking the coarse, wiry grass.* (Above) *But farther down the valley, just north of Llangurig, the land is arable, is diversely farmed with crops and cattle, and the slopes, studded with trees, seem much less hostile*



A. J. Thornton

Below Llangurig, where the Wye, skirting the hills dominated by Gammalt, pursues a winding, southerly course lined with trees and broken into many pools, a favoured haunt of salmon

(Above) *A link with industry: one of the Birmingham Corporation Reservoirs in the valley of the Elan, the river which joins the Wye near Rhayader.* (Right) *About fifteen miles south of Builth Wells the Wye abruptly changes its course to north-east, and at the same time acquires a fresh attitude toward the journey to the sea: no longer dashing hastily on its way, but pausing with reflective procrastination as if to admire the countryside which stretches away from either bank. This view shows it skirting the Black Mountains, so called because the northern slopes are forever plunged in dark shadow*

With an air of sanctity and appropriate decorum, the Wye flows slowly by, under the walls of Hereford cathedral, noted more for its 13th-century map of the world and large chained library than for any special architectural distinction. The city has had a turbulent history: until the 12th century it was a centre of conflict, lying in the no-man's-land between first the Saxons then the Normans in the east and the Welsh in the west, and was involved in every civil war up to the time of Cromwell

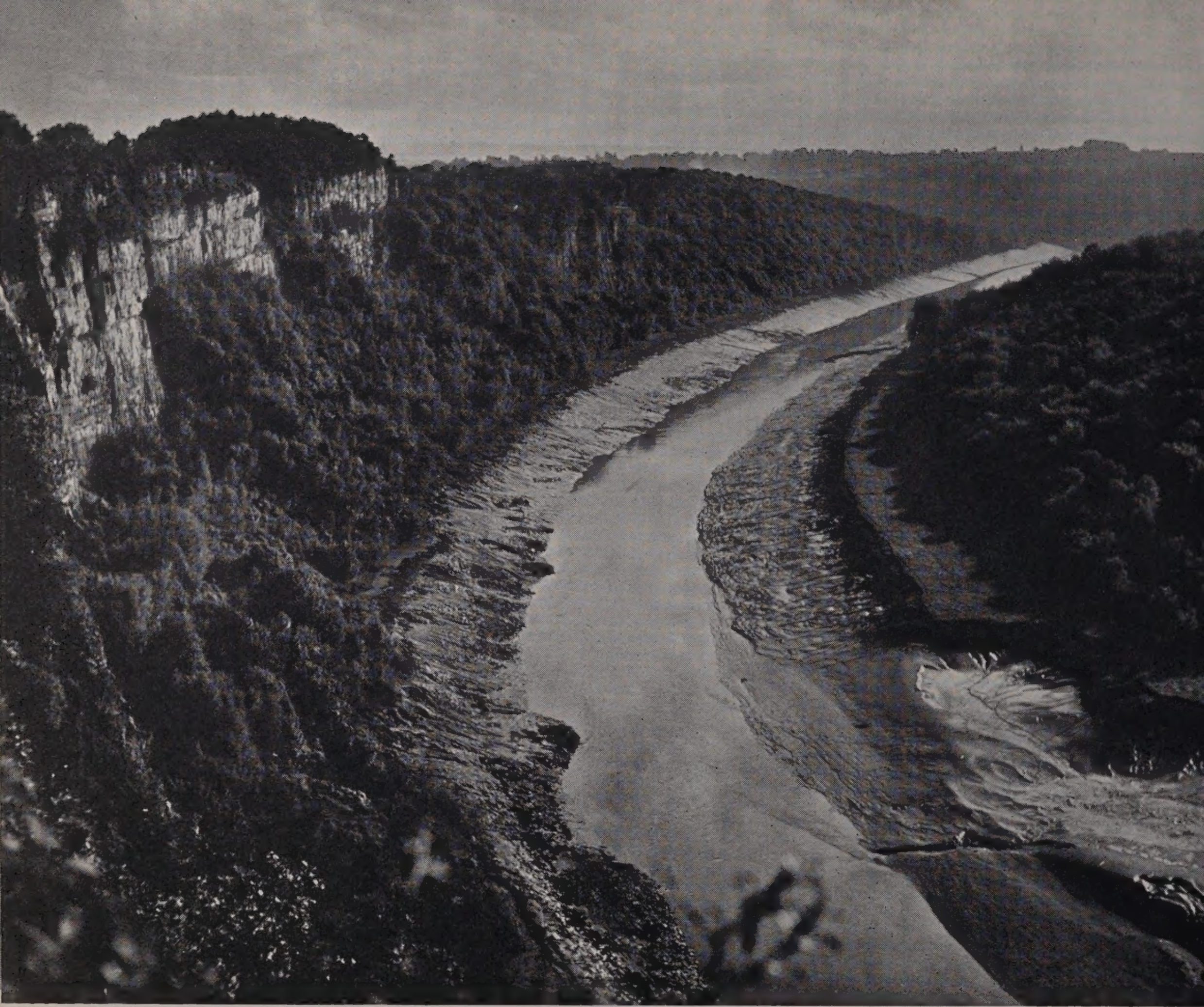
Leaving the boundary of England and Wales, the Wye emerges into the Herefordshire plain, a land of prosperous communities, producing apples, hops and the famous cattle of its name. (Opposite, above) *A farmhouse which seems, like most of its neighbours, as deeply rooted as the surrounding trees.* (Opposite, below) *Just north of Hereford the river glides through rich fields that provide grazing for magnificent beef-cattle, and amongst cider-orchards of unsurpassed quality*

Only the mediation of the Wye seems to stop menacing, wooded Capler Hill from sweeping across the plain

The ancient town of Ross, crouching on its rocky promontory, commands a fine view up and down the valley

(Above) *At Symonds Yat* (*or* '*gate*') *the Wye is contorted by precipitous hills into a series of curves, one of which, after a winding course of four miles, returns within 600 yards of its earlier point of departure.* (Left) *A few miles below Ross the ruins of Goodrich Castle stand on a bluff overlooking river and plain. Begun in the 11th century in defence against the Welsh, the Norman keep survives. During the Civil War it was held by Royalists, but in 1646 surrendered to Cromwell's men and was ordered by Parliament to be "slighted"*

(Above) *Tintern Abbey was founded as a Cistercian monastery in 1131. A long time ago this graceful building resigned itself to dignified decay, but its beauty has provided an awed and peaceful inspiration to poets, particularly, perhaps, to Wordsworth, in his* Lines Above Tintern Abbey. (Right) *Monnow Gate, which straddles one of Monmouth's bridges. It was built in the 13th century as a toll-gate, and is notable as being the only fortified gatehouse in this country on a bridge. The Monnow, with its source in the Black Mountains, joins the Wye near the town's centre*



A few miles north of Chepstow the river goes into a tortuous S-bend known as Lancaut Loop (above) *; it is forced into this wide detour by the hard, densely wooded rocks which crowd it in on either side. Here the Wye is already a tidal river and continues to spread itself placidly with soft, bubbling mud-banks in* (left) *the last few miles before it flows out into the Severn*